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Therapeutic Gazette.

Whole Series, Vol. XVIII. | DETROIT, MICH., PHILADELPHIA, PA., | June 15, 1894. | Third Series, Vol. X. No. 6.

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Original Communications.

A NEW BLOODLESS OPERATION FOR THE EXCISION OF HEMORRHOIDS, WITH HEALING BY FIRST INTENTION.

By H. M. Bishop, M.D., Los Angeles, Cal.

In the domain of surgery no field has been fought over more energetically in modern times than that which pertains to operations on the rectum, and particularly to the removal of that most important, because so common and distressing, ailment, hemorrhoids. The most valorous determination to rescue its treatment from the uncertainties and vagaries of empiricism and to establish it on sound surgical principles has actuated the advocates of the various methods now in vogue.

Believing that a process of dealing with hemorrhoids, evolved from my own conceptions after many years of contemplation and trial in devising means to harmlessly control hemorrhage while excising the tumors and redundant folds of the rectum, and likewise to hold in perfect and undisturbed coaptation the edges of the incision, will receive favorable consideration from intelligent and unbiassed promoters of advanced surgery, I will, without further

consumption of valuable time, enter *in medias res* with as little vexing of the polemics of the subject as possible.

The following is the *modus operandi:* With a lateral or dorsal decubitus, as convenience or expediency may decide, and with an aseptic perineum and dilated sphincter, gently and smoothly clamp the base of the hemorrhoids with suitable forceps, so as to parallel the approximated surfaces and free them from folds and other inequalities; then, having left room between the clamp and adjacent healthy tissues, apply on either side a sufficient length of rubber tubing five or six millimetres in diameter, with a lumen of one millimetre, and secure with aseptic catgut after the general manner of the quilted suture. To assure accuracy of adjustment, the pieces of tubing should be of the same length, and have corresponding marks six or eight millimetres apart, indicating the locations for the sutures. Each tube should have its extremities hermetically sealed by the sutures there tied, thus adding a degree of pneumatic elasticity to that possessed by the rubber. All the sutures should be preapplied or tied beforehand to one of the pieces of tubing, with threaded needles in each of the opposite loops, ready for transfixing the tissues and tying over the other piece of tubing. Remove the forceps, and excise the tumor close to the rubber tubing with flat scissors. I have sometimes varied the fixation of the tubing by using one piece doubled upon itself and drawn together with a continuous suture, made to assume an advancing figure of eight, or double spiral, by passing the needle always close to the forceps and the thread always encircling the tube from below upward; the perforations then are in one line and the tension evenly distributed. Where many stitches are to be taken, it saves the time consumed in tying. This completes a bloodless operation, for the elasticity of this welted suture supplies sufficient pressure to prevent all hemorrhage, and maintains in perfect and uniform contact the margins of the wound without endangering from local asphyxic and necrotic conditions consequent to rigid clamping and without interfering with the plastic exudation of repair by first intention.

The further dressing of the wound consists simply in passing a strip of moist borated gauze into the rectum, leaving an end protruding from the anus. The catgut sutures soften in due time and permit the tubing to pass away, while the flexibility of the latter has adapted itself to the environments, with the minimum of annoyance to the patient.

What the Esmarch bandage is to amputations, the same is this elastic quilled suture to the removal of hemorrhoids or other angiomas from surfaces sufficiently lax to allow of approximating folds of sound tissue at their base. Compared with the ligature, it possesses all its advantages with none of the disadvantages attendant upon the distorted, puckered strangulation of the parts, followed by sloughing and ulcerative healing. The clamp and cautery also leave surfaces of crushed and lacerated tissue which the hot iron at best must transform into a burn of the second grade, with inevitable cicatricial contraction. Whitehead's operation is prolix, tedious, and wasteful of the vital fluid. The injection of carbolic acid is unreliable and precarious, save in expert hands, and even then we must wait for nature to expel the mummified mass and fill in with granulation before the cure is perfect. The accidents and lack of success that have been known to attend these various methods are apologetically attributed by their champions to unskilful hands. I feel confident that this new method will succeed with those who make no claim to extraordinary cleverness. It approaches the ideal of operative exæresis, and attains the desiderata of all surgery,—speedy and clean removal of the condemned part, economy of blood, and primary union.

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FRACTURES OF THE NECK OF THE FEMUR AND THEIR TREATMENT.

By Bedford Brown, M.D., Alexandria, Va.

MY personal experience in fractures of the neck of the femur comprises fourteen cases. Of these, about ten per cent. died in less than twelve months from complications, as inflammation and suppuration at the seat of injury, and fever; two per cent. were bedridden for the balance of life; the remainder recovered sufficiently to walk with the aid of a cane or crutch for the balance of life. All the bedridden cases were of the extracapsular variety, while the cases that recovered the power of locomotion were of the intracapsular non-impacted variety.

All of these cases of fracture of the neck of the femur occurred in females varying in age from sixty to eighty-five years. These fourteen subjects presented every variety of conformation of figure. In two there was great obesity. In some the figure was tall and spare, while in others it was quite *petite* and very delicate

and slight. In one the figure was that of a very robust woman a little over sixty. In one, a woman of eighty-five, the weight did not exceed eighty pounds and the person was very emaciated.

Causes of Fracture of the Cervix Femoris.—The causes of this fracture may be classified as the direct or major and the indirect or minor.

The major form of cause is always from direct violence, as a sudden fall from a distance on the hip, or a violent blow or great pressure from mechanical causes on the same point. On the contrary, the minor causes are always of the indirect variety from unusual sudden pressure on the foot while walking, a slight misstep, sudden twist of the foot in walking.

A knowledge of the major and minor or direct and indirect character of the existing causes will aid us materially in differentiating the variety and location of the fracture. The major or direct causes almost invariably cause the extracapsular variety of fracture with or without impaction, while the minor or indirect causes produce intracapsular fracture.

Symptoms.—In all cases of suspected fracture of the neck of the femur, the entire person, from the anterior superior spinous process of the ilium to the toes, with exception of the external genital organs, which can be protected from view by a napkin, should be exposed to inspection. After the clothing has been removed above the pelvis, we are at once enabled to see the relationship of the two opposite trochanters to each other, their corresponding appearance, their relative prominence. We can also observe the relative positions of the two limbs throughout their entire length, and we can better detect the slightest eversion of the foot, the least departure in its direction, and at the same time the least degree of shortening of the limb. Much of the information gained by this investigation is in these cases derived from comparative observation. The trochanter should first be examined. In the fractured bone, except in cases of impaction and non-displacement of the fractured ends, the trochanter is depressed and flattened, compared with the sound side, and when moved from side to side the arc of the motion is considerably reduced. Extending our investigation downward, we observe the lower or tibial end of the patella does not correspond with that on the sound side. It is from a quarter of an inch to an inch above the line of that of the sound limb. Continuing our observations to the foot, we find a shortening of the limb to the extent of from a quarter of an inch to an inch and a quarter in length; at the same time we find the foot of the injured limb everted. When by our own aid we correct this eversion, it invariably returns spontaneously, and when the patient is requested to correct it she is unable to comply with the request. Here we have a typical picture of a simple fracture of the cervix femoris: first the depressed flattened trochanter, the difference in the line of the corresponding patellæ, the shortening of the limb and eversion of the foot. When the entire person is exposed, without any movements of the patient or manipulation on our part, the eye can detect these peculiarities at a glance.

Then, again, in non-impacted fracture, if an assistant grasps the foot of the injured limb, and alternately extends and relaxes the limb, while the attendant grasps the trochanter and presses it firmly towards the pelvis, distinct crepitus may be detected.

Methods of Differentiation between Intracapsular and Extracapsular Fractures.—In determining the important question whether a fracture is intra- or extracapsular, is non-uniting or uniting, the peculiar character of the cause assumes diagnostic importance. It may be said, with much degree of certainty, that shortening of the limb to the extent of a half or one inch, eversion of the foot, moderate pain in the hip, no indications externally of contusion, some crepitus on extension, flattening of the trochanter occurring after a slight indirect injury, as a very sudden misstep, striking the foot against the floor or steps forcibly, or a sudden twist or wrench of the foot from any slight cause in the aged, denote intracapsular fracture, with no possible tendency to unite. On the contrary, shortening of the limb to the extent of from one to two inches, with eversion of the foot, great pain in the hip, flattening of the trochanter, effusion in the surrounding tissues in front and rear of trochanter, crepitus on extension in the comparatively young, much contusion of soft parts from a major form of cause, as a violent fall, blow, or pressure directly on the trochanter, denote extracapsular fracture, with tendency to union of ligament.

Then, again, a slight shortening of the limb and eversion of the foot, with much pain on attempted motion, absence of crepitus, slight ability to raise the limb or stand upon the foot, great effusion in front and rear of trochanter from a violent direct injury to the trochanter, with contusion of soft parts, indicate impacted fracture.

Diagnosis of Impacted Fracture of the Cervix Femoris.—The two cases of impacted fracture of the neck of the femur which came under my

observation both resulted from indirect and violent causes. In one the patient was seventy years old, and had a violent fall directly on the trochanter of that side. The trochanter was found, on comparison with the opposite side, to be flattened and depressed, and very tender on pressure. There was considerable swelling back of the trochanter, and in front, below Poupart's ligament, there was great swelling and much pain and tenderness. There was entire loss of power over the limb and inability to stand on it.

Shortening of the limb was imperceptible and eversion was entirely absent. The injury occurred more than six years since, and the patient has never recovered the use of the limb and is still comparatively bedridden.

The second case occurred in a comparatively young person, with symptoms identical to those of the former, and has never recovered a fair degree of locomotion in the limb since the injury.

Complications.—One of the most serious complications observed in my experience has been symptomatic fever following the injury. It is more apt to occur in the extra- than the intracapsular variety, because the causes are of a more violent character and the anatomical structures of the part are more extensively lacerated.

I never saw but one case of protracted fever following intracapsular fracture in an aged person recover, and that was in the case of a woman aged eighty-five. She recovered, and lived in comparative health and comfort to reach ninety years, and then died from hemiplegia.

A temperature ranging from 101° to 103° F., a quick pulse, pain and restlessness, denote serious organic changes going on in the injured structures, that if permitted to progress will continue until extensive inflammation, effusion of exudates, and suppuration intervene.

Treatment of Fractures of the Neck of the Femur.—There is no class of fracture that requires the exercise of more judgment in their treatment or more accuracy in diagnosis than fractures of this kind.

In one variety of fracture—the extracapsular—in those below middle life we can with safety adopt means to bring about union. To adopt the same means in intracapsular fracture in the aged would insure certain death; hence the importance of an accurate differential diagnosis.

Treatment of Intracapsular Fractures.—In my own experience a good rule to work by in treating intracapsular fractures of the cervix femoris in the aged is not to expect union of the fractured bones, but, on the contrary, to so conduct the management of the case as will, if possible, insure a good, strong false joint, by which, after a time, the patient can regain a fair degree of locomotion for the balance of life. To bring about this desirable object, the pelvis from the anterior superior spinous process is enveloped with a broad flannel roller four inches wide and fifteen feet long, applied down below the trochanters. This flannel bandage gives comfort by the support that it affords the fractured bones and the prevention of too much motion, and gives opportunity to the soft parts involved to throw out adhesive exudations. This is the full extent of the apparatus to be applied. As for the balance of treatment, pillows long and short, small and large, are to be relied on for splints and supports. Comfort of position is to be the guiding rule in the management of this class of cases. The ingenuity of surgeon and nurse will be taxed to so arrange the pillow-splints as to insure comfort, relieve pain, and secure sleep. When these objects are accomplished all has been accomplished that judgment and experience can do until inflammatory action subsides and the process of fibrinous exudation is completed, and then the false joint is ready for use. To attempt, on the contrary, to confine this class of patients in a stiff apparatus, with the view of accomplishing that which no power can ever effect,—a union of bone or ligament,—is to condemn our patient not only to unnecessary suffering, but to certain death.

In the treatment of extracapsular fracture from violent and direct causes in the comparatively young, we may calculate with a degree of certainty on ligamentous union, provided the method adopted will maintain perfect adaptation of the fragments, and we can adopt such method and apparatus as will insure this end without fear of detriment to the patient's health. After the pelvis has been firmly enveloped in the broad flannel roller, as in the former case, then Buck's extension apparatus is applied and the extension maintained until union takes place, which is usually about six weeks.

In impacted fracture my method of treatment has been to envelop and support the pelvis and fractured hip-bones by means of the flannel bandage, which I consider better and more comfortable than a simple band. For the purpose of supporting the limb and preventing motion, which might cause dislocation of the fractured bones, two sand-bags are used, the longer external reaching from above the pelvis below the foot, the other, shorter,

reaching from a little below the external genitals on the inside of the limb below the foot. These arrangements appear to meet the desired ends better, in my own experience, than any other.

THE INJECTION IN PNEUMONIA AND TYPHOID FEVER OF SERUM FROM CONVALESCENTS.

Read before the Section in Pathology of the Pan-American Medical Congress.

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and
W. S. Carter, M.D.,
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BEFORE taking up the consideration of the actual cases of these injections themselves, let us glance briefly at the conditions which have led up to them, the evolution of theories which have made them possible, and the final results, towards which they are but stepping-stones. And these are all bound up within the problem of immunity,—a problem which has ever engaged the attention of observers, a problem which has baffled even theory, and the solution of which will go far towards the rounding out of the circle of medical investigation.

Immunity is natural or acquired. Natural immunity is first, inherent in races or species, due here either to processes acting along the lines of evolution or, on the other hand, to the continued failure of the causative microbe to adapt itself to conditions existing in the host; second, sporadic,—that is, existing in scattered individuals of a species,—a condition difficult of explanation, but probably, again, evolutionary. Acquired immunity, differing radically from the natural, is brought about by a slow habituation to the poison, probably by a process analogous to vaccination, by vaccination itself, or else is due to a previous attack of disease. It is this acquired immunity which is so difficult of explanation,—a difficulty shown by the numerous theories brought forward towards its elucidation, and by the warmth of support which every one of these theories has elicited.

The theories which at present are most prominent, and, indeed, to which all others may in some manner or other be referred, are that in which the cells play an all-important *rôle* (phagocytosis), and that which attributes the whole protective power to the blood-serum. The old explanation given for immunity before the part played by bacteria in the production of disease was clearly known—that of exhaustion of the soil—has been almost completely cast aside; unfortunately so, perhaps; for, reasoning by analogy with the higher vegetable growths, it is more than possible that this may eventually demonstrate itself to be a most important factor. However, it is not our purpose here to discuss at length the theories of immunity, much less to attempt to decide between them; the ground has been so thoroughly gone over that to reharrow it would be wearisome as well as useless, and, too, the time is not yet ripe; there are as yet too few facts in our possession; our knowledge does not yet extend far enough to make a definite decision tenable.

There are, though, some facts necessary to be made prominent, lest we fall into error. While bacteria are the cause of a disease, yet its symptoms are due not to the bacteria themselves, but to products attendant upon their growth, and the destruction of these products, while causing an abatement of the symptoms, may still have no effect upon the bacteria and may not be at all concerned in the production of immunity. Again, care should be taken not to identify the action of blood-serum with that of blood-plasma, for it is well known that while serum may be strongly bactericidal, yet in the plasma from which the serum was drawn the bacteria may flourish luxuriantly. Further, as the *ultima Thule* of our investigations is the preservation of life, we must not be led away by theories looking to brilliant immediate results, but rather gather together our facts slowly and surely, looking not for an instant reward, but hoping everything at the hands of the future.

The knowledge that we have acquired of the production of immunity is briefly this. The introduction into the blood of animals of immune blood, of attenuated bacteria, or of the products of bacterial growth may render these animals unsusceptible afterwards to that disease. Whether this immunity is due to a failure of the bacteria to grow or to a loss of lethal power of their products is a moot point; at least this much is evident: it is the result of some change in the condition of the immune animals. Most experiments have been done upon animals; the few on human beings are much the most valuable, but at the same time much more liable to error and to lead to false deductions. It can readily be seen why this must be so. We cannot control nearly so completely the conditions which surround a man as those among which a white rat lives.

The first impulse is to attempt to produce a cure, to brilliantly imitate nature or even to

improve on her, and, stepping in suddenly, end a disease. But it must be steadily borne in mind that the production of a cure is not necessarily the production of immunity; cure and immunity may not be strictly synonymous. It is true that after the cure immunity follows; but may not the production of cure be merely a step in the production of immunity? May it not be brought about in various ways, and the destruction of the symptom-producing toxines a process so varied and indefinite that even after its nature is fairly understood it may be of little practical importance? Therefore it would seem possible that, while the destruction of the toxines may seem the simplest and easiest way of attaining our end, yet in reality that end can be attained only through a thorough understanding of the deeper processes that underlie the production of immunity and be protection rather than cure. The only disease in which such protection has been a perfect success is small-pox, and here vaccination was stumbled upon, and its processes are even yet not understood. The only other disease in which efforts have been made to produce results by a process similar to vaccination is hydrophobia, and here the success is somewhat doubtful. On the other hand, in three diseases—tetanus, measles, and pneumonia—a cure has been striven for by the injection of immune serum. Because a certain result follows a certain procedure in one disease is no good reason why this should hold good in an allied disease. We know too little of the life histories of micro-organisms to generalize successfully. That there are different methods for the production of immunity, and so different methods of cure, is probable from the existence of natural immunity. The blood of animals naturally immune seems to have little effect in conferring immunity, nor does the serum from such blood differ in its bactericidal power from serum from susceptible animals. In the three diseases above mentioned the procedure adopted has been the injection of serum from animals or persons rendered immune by previous vaccination or disease. Here, looking at the results obtained, the theory has been advanced that the cure is brought about by a neutralization of the toxines, and that it is this antitoxic material which confers immunity. In tetanus, the method has been a success; in measles, at least doubtful. Pneumonia, which more nearly concerns us at present, was experimented upon first by the Messrs. Klemperer. They announced the following facts: Animals can be immunized by the introduction into their blood of the sterilized products of the diplococcus; heating these products to 140° F. hastens the process. This immunity is conferred only after the lapse of some time, and is attended by fever. The introduction of immune serum confers immunity immediately. This paper was soon followed by the publication of other cases. Among others, we published* a case where we used intravenously defibrinated blood, and gave our reasons against a repetition of such a procedure. Since the publication of our paper, Audeond† and others have placed cases on record, till at the present time there are records of thirty-nine cases, of which all but one have been successful.

The fourteen cases of the present series, which we shall ask you to consider, were selected carefully, as being typical, and taken at a time when there would be little danger of confounding the result obtained from the injection with the natural crisis. In all serum was used, which was obtained most frequently by venesection, occasionally by blistering. The serum was injected subcutaneously, this having been found to be as efficacious and less dangerous and troublesome than intravenously.

CASE I.—In Philadelphia Hospital. Man, (negro) aged twenty-six years; pneumonia involving whole of right lung; general symptoms of quite marked severity; temperature averaging about 103° F.; diplococci in sputum. On the fourth day of the disease, at 2 A.M., 7 cubic centimetres of serum were injected, and again at 9 P.M. 25 cubic centimetres. The first injection was followed by no change whatever in the temperature. Twelve hours after the second it fell to 101° F., but rose again immediately, though never to the height it had maintained before the injections. It was not till the eighth day that the crisis occurred and the temperature fell to normal. After this there was a secondary rise, the normal being finally maintained after the tenth day. Beyond the trifling lowering of the temperature after the injections, there was no effect produced upon the general symptoms. Resolution of the affected lung was rather slow than otherwise.

CASE II.—In Philadelphia Hospital. Man, aged fifty years; alcoholic pneumonia of moderate severity; consolidation involving part of lower left lobe; temperature not high, ranging between 101° and 102° F.; diplococci in sputum. On the fourth day 25 cubic centimetres of serum injected, which was followed in twelve hours by a subsidence of the temperature to normal and a complete amelioration of the

*THERAPEUTIC GAZETTE, October 15, 1892.

† *Rev. Méd. de la Suisse Romande*, February 20, 1893.

general symptoms. The man died, however, about a week later of uræmia. The death could in no wise be attributed directly to the pneumonia, convalescence from which was complete. Albumin and casts had been noted in the urine during the febrile period, and it is probable from his history that the Bright's disease antedated by some time the pneumonia.

CASE III.—In Presbyterian Hospital. Man, aged sixty-seven years; both lungs involved irregularly at the bases, but consolidation nowhere perfect; general symptoms of great severity; typhoid state; low, muttering delirium; marked heart-weakness. Temperature quite irregular, ranging between 100° and 104° F. Diplococci present in abundance in the sputum. On the ninth day, at 4 P.M., 25 cubic centimetres of serum injected. On the next day, at 1.30 P.M., 15 cubic centimetres. The injections had absolutely no effect upon either the temperature or general condition, and the man died six hours after the administration of the second one. The post-mortem examination showed a condition of lungs suggestive rather of broncho than of lobar pneumonia, although there were present copious virulent diplococci.

CASE IV.—In Presbyterian Hospital. Man, aged forty years; right apical pneumonia; symptoms of moderate severity, temperature averaging about 102° F.; diplococci in sputum. On the fourth day, at 4 P.M., 9 cubic centimetres of serum injected. At 8 P.M. the temperature commenced to fall, and four hours later it reached 95.4° F. Convalescence was rather protracted, though this was probably the result of concomitant conditions. The man gave a history of syphilis and had Bright's disease, dating back at least four years.

CASE V.—Girl, aged eight years; pneumonia of right lower lobe; symptoms of moderate severity, temperature ranging between 102.5° and 103.5° F. On the third day 2 cubic centimetres of serum injected. The temperature maintained its usual range for twenty-four hours, when it commenced to fall, and by twelve hours later had reached normal. The pneumonia was followed by a trifling pleural effusion without any return of fever, but this was quickly absorbed and scarcely at all retarded convalescence.

CASE VI.—In Presbyterian Hospital. Man, aged twenty-four years; pneumonia of right upper lobe; general symptoms of pronounced severity, verging on the typhoid state, temperature ranging between 103° and 105° F. On the fifth day, at 8.30 A.M., 25 cubic centimetres of serum injected. By midnight the temperature had fallen to 100° F., delirium had disappeared, skin was cool and moist, and, in short, the general condition was immensely bettered. After this the temperature slowly rose, ranging between 101° and 103° F., but never attaining its previous maximum, and the delirium and other bad symptoms returned in a measure. It is perhaps worthy of note that during this period cold sponging produced a marked temporary abatement of the fever, while previous to the injection it had but little effect. Through an inadvertence no further injection was given till the eighth day, when 5 cubic centimetres of serum were used. Promptly after this the temperature fell to 97° F. Convalescence was very rapid.

CASE VII.—In Presbyterian Hospital. Boy, aged eleven years; case of moderate severity, temperature ranging between 102° and 104° F. On the fourth day, at 2.30 P.M., 11 cubic centimetres of serum injected. By 2 A.M. of the next day the temperature had fallen to 96.8° F. Convalescence was rapid.

CASE VIII.—In Philadelphia Hospital. Man, aged twenty-eight years; pneumonia of left lower lobe; symptoms of moderate severity, temperature averaging about 103° F.; diplococci in sputum. On the fifth day 25 cubic centimetres of serum injected. Twelve hours after the injection the temperature had fallen to normal.

CASE IX.—Man, aged twenty-one years; pneumonia of right lower lobe. This case was seen from the very inception of the disease, and promised in the beginning to be one of only moderate severity. On the second day, at 9 P.M. (forty-six hours after the initial chill), 25 cubic centimetres of serum were injected. The temperature up to this point had been constant at 104.4° F. At 9 A.M. of the following day it was 103.4° F., where it continued throughout that day, with no change in the general symptoms from those of the day preceding. At 9 P.M. 40 cubic centimetres more were injected. Twelve hours later the temperature had returned to its original 104.4° F. At 9 P.M. again on that day—the fourth of the disease—45 cubic centimetres were injected. Five hours later the temperature had fallen to 101° F., but this subsidence was only temporary and unattended by any amelioration of the general symptoms, which had been steadily growing graver. Two days later meningeal symptoms became prominent (before this there had been but the ordinary delirium of pneumonia or any other febrile state), and on the following day he died. At the time of death the temperature had reached 108° F.

CASE X.—In St. Agnes Hospital. Man, aged twenty-five years; upper lobe of right lung completely consolidated; all the symptoms were of pronounced severity; diplococci in the sputum; temperature ranged between 102° and 104° F.; immediately after admission to the hospital it had been 105° F. At the end of the fifth day 50 centimetres of serum injected. No appreciable effect was produced upon the symptoms by the injection, and the man died twenty-four hours later, the temperature at the time of death being 104° F.

CASE XI. — In Presbyterian Hospital. Woman, aged forty-five years; consolidation had involved whole of right lung; the symptoms were of the gravest possible character; temperature ranged between 102.8° and 103.6° F.; diplococci in sputum. On the sixth day, at 11.40 A.M., 30 cubic centimetres of serum injected. This was followed promptly by a rise of temperature to 104.4° F. Then it fell, reaching in fifteen hours 101° F., with a most gratifying change in the general condition. After this the temperature was irregular, ranging between 101° and 104° F., but it was thought that the symptoms lacked the extreme gravity of the period before the injection. It was not till the eleventh day that convalescence, which was afterwards moderately rapid, actually set in.

CASE XII.—Woman, aged forty-eight years; pneumonia of left lower lobe; symptoms of rather pronounced severity, temperature ranging between 103° and 104° F. On the sixth day 25 cubic centimetres of serum were injected, and a like quantity on the seventh day. Absolutely no effect was produced by the injections upon either the temperature or the general condition. The crisis occurred on the tenth day, and convalescence was probably rather more rapid than the gravity of the attack would have warranted.

CASE XIII.—In Philadelphia Hospital. Man, aged fifty years; pneumonia of right lower lobe; condition not at all good; diplococci in sputum. On the fifth day 15 cubic centimetres of serum injected. On the sixth day injection repeated, this time 25 cubic centimetres being used. Neither injection had any effect upon the temperature. Crisis occurred on the ninth day. From the time of the last injection the man complained of pain and soreness at its site,—on the outer aspect of the thigh. This spot afterwards became inflamed, indurated, and eventually the seat of an abscess, which was extremely slow in healing. There was no evidence of any systemic involvement from this abscess, and convalescence from the pneumonia went on uninfluenced by its occurrence.

CASE XIV.—In Philadelphia Hospital. Man, aged thirty years; alcoholic pneumonia; symptoms of extreme gravity, temperature ranging between 101° and 102° F.; diplococci in sputum. On the fourth day, at 4 P.M., 25 cubic centimetres of serum injected. Twelve hours later the temperature had dropped to 100° F., where it remained till 8 P.M. of that day (the fifth of the disease), when 17 cubic centimetres were injected. Six hours later the temperature had fallen to 99.4° F. For the next two days it ranged between 99° and 100° F., then it rose rapidly and the man died, the temperature at the moment of death being 108.2° F. No effect whatever upon the general condition had accompanied the lowering of the temperature following the injections. A short time before death a marked discoloration developed about the site of the second injection, persisting even after death.

Now, what deductions can be drawn from this series of cases? In the light of our experience with the first case injected, together with the results in other published cases, we must confess to a most distinct disappointment. In Cases I. to X. the serum used was apparently as perfect for its purpose as could be wished. It would be a useless expenditure of space and time to particularize the cases whence the serum was obtained; a careful study of them has enabled us to formulate no rules governing its irregularity of action. Suffice it to say that they were all cases of undoubted and typical pneumonia, in every one of which the presence of virulent diplococci had been established. In none of them was the interval which was permitted to elapse between the crisis and the taking of the serum more than two weeks; in many of them it was less. Having these serums, then, obtained under identical circumstances, it was surely to be expected that perfectly regular and definite results would follow their use, but the event proved otherwise. While some of the cases were marked successes, others showed equally pronounced failures. Thus, of the ten cases, only five can be claimed as distinctly proving any effect due to immune serum. In another (Case V.), while a crisis did occur following the injection, yet the time that elapsed before its completion (thirty-six hours) renders it doubtful that this effect was due to the serum, and the fact that an early crisis is not at all uncommon in children strengthens this doubt.

Of the three cases where no result was shown, in Case I. we are tempted to attribute

the at least partial failure to the fact that it was in a negro. Seeing that the diplococci in a negro's sputum seem to be so distinctly more virulent than those in the sputum of a white man, it may be imagined that the same holds good in the lungs, and that a larger dose of antidote would be required. It is possible that, had the first dose been larger or been followed by others, a conclusive result would have been obtained. It seems to be a fact, judging from experiments upon lower animals, that the more virulent the bacteria the less easily antidoted is their toxine. But if the failure here was due to exceptional virulence of bacteria and consequently large amounts of toxine, we should expect an exceptionally pronounced immunity, granting that toxines have anything to do with immunity; and yet, as will be seen later, the serum of this man rapidly lost its antitoxic power. Case III. may be explained by the seeming irregularity of the pneumonia, though, on the other hand, diplococci—that crucial test—were present in abundance. From a careful study of the case, in the light of the symptoms and of the post-mortem examination, I am strongly of the opinion that such explanation is not sufficient, and the case must be classed as an unquestioned failure. In Case IX. no explanation whatever of the failure can be offered. Everything was favorable to the action of the serum. The man came under observation immediately after the initial chill, the general treatment was carried out under most favorable auspices, the quantity of serum used (110 cubic centimetres) was certainly large enough, and yet blank failure resulted: immune serum did not antidote the toxine.

Can we reconcile these discrepancies? It would seem not in the present state of our knowledge. That the irregular results were due to causes inherent in the persons of those injected, essential variations in disease processes, or subtle radical differences in constitution, and not to faulty conditions of the serum, is proved by the fact that different results attended the use of the same serum. Thus, Cases II. and III. had the same serum; II. was a success, III. a failure. Again, Case IV. showed a pronounced success, V. a doubtful result.

The lack of action of immune serum in certain cases might be explained on the assumption (1) of a duality of diplococci causative of pneumonia, (2) of a variation in the toxines, (3) of the inadequacy of the antitoxic theory to fully explain the cure of pneumonia and the subsequent immunity.

1. The Duality of the Diplococci.—While we are still not perfectly familiar with the life history of the specific cause of pneumonia, yet what work has been done and comparison with other specific diseases render this hypothesis only remotely probable.

2. Variation in the Toxines.—Bacteria, in the course of their growth, produce at least three distinct classes of poisons, the individual action of which is not definitely understood. These toxines being somehow instrumental in the production of the fever, it is on their neutralization or disappearance that the end of the fever depends. But these toxines are constant concomitants of the growth of bacteria, and while, under differing conditions of inherent qualities or environment, it is possible that the toxines are secreted in varying proportions, yet it is not likely that the average proportions would ever be so rudely disturbed as to lead to total failure of a neutralizing agent to act. The toxines must always be the same. It requires too violent a stretch of the imagination to conceive that under practically identical conditions of production in some few aberrant cases an entirely unusual toxine had been substituted. Therefore this hypothesis is not to be entertained; and this, then, brings us to consider,—

3. The Inadequacy of the Antitoxic Theory.—This theory proposes a purely chemical action, and, granting that there is a single specific cause for pneumonia and that the toxines produced are always the same, if there be a definite antipneumotoxine, must not its action be the same in all cases? Let us draw attention here again to the probable difference between cure and immunity. Cure, or the disappearance of fever, means the destruction of the fever-producing toxines; immunity, the impossibility of bacterial growth or failure of secreted toxines to produce deleterious effects. Are these two cases necessarily identical? We are driven to the conclusion by consideration of these cases reported that they are not; the neutralization is merely a step in the production of immunity, and its causes will have to be sought deeper down. At the same time there may be a neutralization of poison by substances in the immune serum, but these substances may exist only in the serum and not in the plasma, and really not be concerned in the production of immunity.

While, therefore, it cannot be doubted that immune serum may have a most pronounced effect, yet the irregularity of its action certainly suggests strongly that there are important factors other than the antipneumotoxine concerned in the production of the crisis and the subsequent immunity. What these factors may be it is impossible to indicate, but it would seem

probable that they are to be found rather in some condition of the cells than of the blood-serum.

One thing in these experiments we have been most certainly unable to do,—that is, to duplicate the results published by several observers obtained by very small quantities of serum. In the only case where we ventured to use so small quantity as 2 cubic centimetres (that of the child, where surely a small quantity would be most likely to be sufficient), the result was practically negative.

We have considered hitherto only the first ten cases, where only perfect serum was used; the other cases were injected with serum which might be supposed *a priori* to have a less definite effect. In Cases XI. and XII., and in the first injection in Cases XIII. and XIV., the serum was obtained from a case of abortive pneumonia, the crisis having occurred on the third day. The case was one of unquestioned pneumonia, diplococci being present in great abundance in the sputum. Such abortive pneumonia can be best explained by the incidence of pneumonia on a case almost but not quite immune naturally, and were the antitoxic theory correct, one should expect a most marked effect, instead of which the results were all purely negative, except in Case XI., where the result was at least doubtful. This would bear out what has previously been found to be the fact, that naturally immune serum does not protect, and strengthen the hypothesis of different methods for the production of immunity.

In Cases XIII. and XIV. the serum used was obtained from Case I. (the negro) five weeks after his crisis. Within two weeks after his crisis he had been bled and the serum used with a successful result, but in these two cases the result was negative. Therefore, if these two cases prove anything, serum which was at first actively protective may lose its antitoxic power after the lapse of five weeks.

From a therapeutic stand-point the results of the injections are disappointing. In the ten cases where perfect serum was used there were three deaths. As this is about the ordinary death-rate in pneumonia, as a treatment purely of pneumonia serum injection would scarcely commend itself. With the imperfect serum the death-rate was about the same,—one in four.

The injections are, however, if carried out with proper precautions, perfectly harmless. In none of the cases, either of pneumonia or typhoid fever, were any bad general effects noted. In two cases (XIII. and XIV.) there was local inflammation following the injection, but as the serum used was obtained from one man at the same time, and as, owing to the fact that it was not obtained under our personal supervision, it was in all probability contaminated, this result might have been avoided. One word of caution here about the serum: it must not be obtained from a case where there is any suspicion of kidney-lesion, for we have found* that serum drawn from victims of Bright's disease is capable, when introduced intravenously into dogs, of producing nephritis.

Typhoid Fever.—Stern† has found that white mice injected with a mixture of typhoid bouillon with serum from a recent convalescent from typhoid fever survive, while those treated with unmixed bouillon die. This would seem to indicate some antidotal properties in the serum. Though it is scarcely to be supposed that from two diseases so dissimilar as typhoid fever and pneumonia the same result would be obtained by the injection of immune serum, yet the following experiments were undertaken with the hope that some effect would become apparent. The serum obtained was from convalescents in whom somewhat less than two weeks had elapsed since the end of the fever. It was obtained by means of venesection.

CASE I.—In Philadelphia Hospital. Man, aged thirty years; case of average severity; mild nocturnal delirium; bowels moderately constipated; heart strength well preserved. The history and symptoms pointed to the ninth day as the day on which he came under observation. The temperature would have ranged probably between 102° and 104° F., but sponging and bathing kept it between 100° and 103° F. On the twelfth day, at 7.15 P.M., 60 cubic centimetres of serum were injected. At midnight, after sponging, the temperature was 98.4° F.; previous to the injection it had never been reduced by sponging or bathing below 100° F. This seemed to inaugurate the gradual defervescence of the temperature. On the fifteenth day it reached normal in the morning, and from the twenty-second day on it was permanently practically normal. Convalescence was rapid.

CASE II.—In Philadelphia Hospital. Boy, aged nineteen years; first seen on seventh day; light case; very slight nocturnal delirium; two or three stools a day; heart quite weak; temperature ranged between 100° and 102° F. On the twelfth day, at 7 P.M., 20 cubic centi-

* Boylston Prize Essay, to be published in the American Journal of the Medical Sciences.

† *Deutsche Med. Wochenschrift*, September 15, 1892.

metres of serum injected. 11 A.M. next day temperature 98.4° F.; then it rose to 101° F. Injected again at 5.15 P.M. 20 cubic centimetres. 2 A.M. next day temperature 98.4° F.; then it rose till at 6 P.M. it was 100.4° F., when he was again injected with 20 cubic centimetres of serum. After this the temperature rose till at 9 P.M. it was 101.8° F. It slowly settled after that, and convalescence set in on the eighteenth day.

CASE III.—In Philadelphia Hospital. Boy, aged eighteen years; came under observation on the eighth day; case graver than the preceding; quite marked delirium; heart rather weak; very slight diarrhœa; temperature ranged between 102° and 104° F., but could be depressed to 99° F. by sponging. Injected as follows: twelfth day, 10 cubic centimetres of serum; thirteenth day, 10 cubic centimetres; fourteenth day, 25 cubic centimetres. No effect was apparent on the temperature till the fifteenth day, when it ranged between 100° and 101.8° F. It gradually fell after that, remaining at normal from the twentieth day on.

These cases were none of them especially grave, and would certainly have recovered in the natural course of events. The type of typhoid fever prevalent was mild and irregular, and these cases were selected as being the gravest and most typical obtainable at that particular time. Some of the companion cases ended as early as the end of the third week, and it may be that the cases above recorded ran a normal course uninfluenced by the injections. Still, it is unusual to have three consecutive cases of typhoid fever terminate as these did on the twenty-second, eighteenth, and twentieth days respectively. If the serum had any immunizing effect, it acted as would have been expected, not by producing any sudden fall of temperature, but by bringing on the gradual termination of the fever sooner than it would otherwise have occurred. In spite, then, of the mild nature of the cases and the somewhat irregular action of the serum, we are inclined to the opinion that the serum had some effect. It is unfortunate that it could not have been tried upon some severe cases.

It affords us great pleasure to express our thanks to Drs. J. H. Musser, D. F. Woods, and J. P. C. Griffith for their kindness in placing at our disposal cases of pneumonia under their care in the Presbyterian and St. Agnes Hospitals, and to the resident staff of the Philadelphia, Presbyterian, and St. Agnes Hospitals for assistance in the observation of the cases.

THE PHYSIOLOGICAL ACTIONS OF ALCOHOL.

ABSTRACT OF A PAPER PRESENTED TO THE SECTION ON THERAPEUTICS OF THE FIRST PAN-AMERICAN MEDICAL CONGRESS, HELD AT WASHINGTON, D. C., SEPTEMBER 5, 6, 7, AND 8, 1893.

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(Concluded from page 309.)

ON DIGESTION.

IT is almost an established fact that alcohol in small doses aids the process of digestion. This may not be an absolute rule, but it certainly holds good in the large majority of cases.

It is true that some observers deny to alcohol any such action, but on examining the clinical literature of this part of the subject (which is certainly, to say the least, an extensive one), it is found that those who uphold this latter view form the minority.

Buchner,* from the results of a series of experiments, comes to the conclusion that ten per cent. of alcohol does not affect artificial digestion, while beer, even when used in dilute form, retards the process. His assertions, however, have not been absolutely confirmed. It is true that Gluzinski,† who gave the drug to fasting individuals, found that digestion, as influenced by alcohol, may be divided, in the case of healthy persons, into two phases: the first characterized by marked retardation of proteid digestion, the nitrogenous materials failing to be changed into peptones until the alcohol was removed; the second stage beginning after the removal of the drug, when the secretion of gastric juice is so abundant that in the end the food is digested as soon or sooner than if no alcohol had been administered.

On the other hand, Mohilansky‡ affirms that alcohol, taken in small quantities, distinctly improves the appetite and gives rise to a marked increase in the assimilation of the nitrogenous constituents of food, this increased assimilation being due to a more complete absorption and intensified gastric digestion, resulting, as has been stated elsewhere, from a prolonged retention of food in the stomach on the one hand, and from increased digestive power and secretion of the gastric juice on the

* *Deutsch. Archiv f. Klin. Med.*, Bd. xxi. S. 537.

† *Ibid.*, and *Annual of the Universal Medical Sciences*, 1888.

‡ *Loc. cit.*

other. Blumenau* has arrived at similar conclusions. This investigator, with the view of studying the action of alcohol on the functions of the stomach, made a series of experiments upon five healthy individuals, aged from twenty-two to twenty-four. The observations were made in the clinic of Koshlakoff, of St. Petersburg. The drug was given from ten to twenty minutes before dinner, in doses of 100 cubic centimetres ($3\frac{3}{5}$ ounces), and in the form of solutions of the strength of from twenty-five to fifty per cent. The meals allowed consisted of from 500 to 600 grammes (16 ounces) of soup, a cutlet weighing 90 or 100 grammes ($2\frac{1}{2}$ to 3 ounces), and 200 or 250 grammes (6 to 8 ounces) of wheat bread. The author found that during the first three hours after the ingestion of the alcohol the gastric digestion is distinctly retarded, which is caused by a marked diminution of the digestive power of the gastric juice. The diminution is dependent upon the decreased proportion of hydrochloric acid and the general acidity of the gastric juice; this acidity is almost entirely produced by lactic acid. In habitual drinkers the changes are less pronounced than in alcohol abstainers. All other conditions being equal, strong solutions of alcohol give rise to more intense changes than weak ones. The investigator found, further, that during the fourth, fifth, and sixth hours after meals the gastric digestion becomes considerably more energetic, the general acidity of the juice rises from .22 to .35 per cent., and the proportion of hydrochloric acid increases, to reach its maximum (from .12 to .14 per cent.) by the end of five hours after meals, while the lactic acid amount decreases correspondingly, attaining its minimum about the same time, when the acid either gives but a very faint reaction or altogether ceases to give any reaction. Corresponding to the alterations, the gastric juice during the second stage acquires a far higher digestive power. Under the influence of alcohol, the secretion of the gastric juice becomes more profuse and lasts longer than without alcohol. During the first hour the action of pepsin seems to be slightly decreased, because, on adding rennet to cow's milk, it coagulates more slowly than in subsequent hours. In regard to the motor power of the stomach, such was ascertained to be somewhat decreased, as tested by the internal administration of salol, according to the method of Ewald. The same may be said in regard to the absorptive power of the organ, in which case the decrease was determined by the administration of the iodide of potassium. It was found that the intensity of the alteration in the motor and absorbing powers of the stomach corresponds to the concentration of the alcoholic solutions employed.

Of course, in large amounts alcohol hinders digestion very decidedly, and the continuous use of the drug causes pathological changes of varied nature, the principal one of which is that produced upon the liver. That alcohol is a powerful factor in the production of hepatic cirrhosis there is scarcely any doubt. This has recently been confirmed by the results obtained by De Rechter† in an experimental research. The investigator made a series of experiments on dogs and rabbits. After having ascertained the amount of alcohol used by hard drinkers, he administered to the animals employed a mixture consisting of 22.5 parts of ethylic alcohol at 96° F., 2.5 parts of methylic alcohol, and 75 parts of water. Of the ten rabbits and four dogs used, one dog and four rabbits lived long enough to be of use to the experimenter; in the rabbits he found cirrhosis in the portal spaces. In places, bands of connective tissue were found uniting the portal vein with the sublobular veins, but the parenchyma of the organ was everywhere free from change. In the dog there was cirrhosis occupying the sublobular veins, where alcoholic cirrhosis is said by Sabourin to commence in man. De Rechter attributes this difference in development to some modifying influence of the alcohol exercised by the liver of the rabbit. If experimenters have found fatty and cirrhotic change in many cases, the author attributes it to the fact that they used alcohol too short a time and in too large doses.

Be all the results of these researches as they may, certain it is that in the test-tube the digestion of food is retarded or inhibited by the addition of alcohol; yet, in the stomach, on the contrary, alcohol aids digestion, not, perhaps, through any inherent powers of its own, but mainly by virtue of its irritant and stimulating properties, inducing in this manner an increased amount of gastric juice.

On the Urinary Secretion.

How alcohol affects the urinary secretion has not been definitely determined. Mohilansky‡ found that the drug, in healthy people, does not possess any diuretic action; but that, on the contrary, it rather tends to inhibit the

* *Wratsch*, No. 42, 1889, and *Med. Chronicle*, January, 1889.

† *La Presse Médicale de Belge*, June 19, 1892.

‡ *Loc. cit.*

elimination of water by the kidney. Diametrically opposed to this statement is that of Diakonoff,* who observed that alcohol, in febrile patients, considerably increased the daily quantity of urine, markedly suppressing at the same time the aqueous loss through the lungs and by the skin.

From a few experiments performed upon myself, I have noticed that small quantities of alcohol almost always cause an increase in the daily amount of urine secreted. The action under consideration, however, cannot be accurately ascertained, since it must depend not only upon the amount of alcohol ingested, but also upon the condition of the individual, whether this be in a healthy or a febrile state.

It is not at all improbable that if, in a healthy person, the amount of alcohol administered be sufficient to stimulate the circulation, a corresponding activity of the kidneys would be obtained as a consequence of the generally increased arterial pressure. On the other hand, since alcohol in large doses, as has been noticed, tends to markedly decrease the arterial pressure, accompanied by a probable dilatation of the cutaneous blood-vessels, according to Mohilansky, it would naturally be expected that such a phenomenon would favor perspiration and thus interfere with the renal secretion.

The same results might be witnessed in febrile conditions, in which, as has been observed by Diakonoff, the drug, by causing a suppression of watery excretion through the lungs and skin, and undoubtedly a stimulation of the general circulation, produces a marked increase in the daily amount of urine secreted. The question, in the present state of our knowledge of this part of the subject, remains unanswered one way or the other.

What becomes of Alcohol in the Animal Economy?

The last point which I propose to discuss in this paper is that relating to the fate (as the French would have it) of alcohol in the animal economy. This subject naturally deals with the elimination of the drug. Is alcohol eliminated as such, or does it undergo oxidation, as is maintained by a probable majority of writers upon this question? This is certainly of paramount importance, for here lies the basis of the value or the harmfulness or unnecessary use of alcohol in the treatment of disease. Again, not only may it be asked, Is alcohol a general stimulant? but also, Does the drug likewise serve the purpose of a food? These questions, although long-mooted ones, deserve the most careful consideration.

It has for a long time been held that alcohol is completely, or nearly so, burnt up in the system. But in the celebrated work of Duroy, Lallemand, and Perrin it is stated by these authors that alcohol is eliminated unchanged, basing their assertion on the fact that they could not find in the blood or in the tissues the products of alcohol oxidation, such as acetic acid and aldehyde; and on the fact, also, that they found the alcohol unchanged in the expired air, in the urine, and in the sweat. These authors relied on the chromic-acid test, which is said by Binz † to be fallacious. Binz, assisted by Stenbach and Schmidt, in a series of experiments, could not detect alcohol in the breath, affirming, therefore, that no drug was expelled by the lungs. He attributed the odor noticed in the breath of heavy drinkers to the ethers and other volatile principles of the various liquids ingested.

Baudot ‡ also questioned the correctness of the statements of Duroy and Perrin, on the ground that the chromic-acid test is so delicate as to reveal the presence of .165 of a grain in a quart of water. He further noticed, in twenty experiments performed, that, unless it be ingested in enormous amounts, alcohol is practically not eliminated by the urine. These results have been confirmed later by the researches of other investigators, as Anstie,§ Schulinus,‖ and Lieben.¶ Schulinus showed that only very small quantities of alcohol pass through the kidneys, the largest portion of the drug taken into the blood finding its way into the tissues and organs by exosmosis; and in a number of experiments he found that one-fourth of the alcohol administered had disappeared from the body after from two hours to three hours and fifteen minutes. From the fact, again, that only a trifling amount of the drug was eliminated by the kidney, the author arrived at the conclusion that the alcohol given must have been burnt up in the system. The same conclusions are formulated by Lieben and Anstie. This latter investigator detected a small quantity of alcohol escaping from the lungs.

Thudichum, quoted by Wood,** first in 1864

* *Loc. cit.*

† *Loc. cit.*

‡ *L'Union Médicale*, 1863.

§ *Loc. cit.*

‖ *Archiv der Heilkunde*, 1866.

¶ *Annal. der Chim. und Pharm.*, ii., 1870, Suppl. Bd. S. 236.

** *Loc. cit.*

and later in 1866, in collaboration with Dupré,* carried on two elaborate researches on the same subject. In the first investigation the experiments were performed upon thirty-three men, to whom he administered four thousand grammes of alcohol. The drug was recovered from the urine of all the men by repeated distillation, in order to avoid the fallacies of the chromic-acid test. In this manner the experimenter obtained from the urine, within six hours after the ingestion of the drug, only .25 per cent. of the amount of alcohol given. Identical and perhaps more accurate results were obtained by the same observer in his second investigation. In this instance greater care was taken to avoid loss during distillation, and he then recovered from the urine .82 per cent. of the alcohol administered.

This experimentation was repeated by Subbotin † on six rabbits. This investigator claims to have demonstrated that the elimination of alcohol continues for a longer period than is generally believed, and that twice as much of the drug escapes through the skin and lungs as by the kidneys. His results, however, do not disprove those of the observers just mentioned, since he employed very large amounts of alcohol, in which case the elimination must be in direct proportion to the quantity ingested, for certainly a limit to the powers of the system to oxidize alcohol must be expected.

In a series of experiments, Edes ‡ observed that elimination of alcohol is greater by the lungs than by the kidneys, after small amounts, the contrary taking place under large doses of the drug. Not much weight, perhaps, can be attached to these statements, from the fact that the author relied chiefly on the chromic-acid test. But Anstie,§ in a second series of experiments upon dogs, using the method employed by Subbotin, confirmed the results obtained in his (Anstie's) first investigation. He found but a very trifling amount of alcohol left in the body. Similar results have been obtained by Bodländer ‖ from experiments performed upon himself and on dogs. His studies have been repeated and his observations apparently confirmed by Wöhler.¶ Bodländer found, by experiments on himself, that elimination occurred by the kidneys to the extent of 1.2 per cent. and by the lungs to 1.6 per cent. of the amount of alcohol ingested. In the dog, he recovered from the urine 1.6 per cent. and from the breath two per cent. No alcohol was detected by this experimenter in the intestinal excretions, nor in the milk of a goat to which nearly a quart of brandy had been administered.

It was first discovered by Lieben,** and afterwards by Dupré †† and Bechamp,‡‡ that a body closely resembling alcohol occurs in the urine of habitual abstainers. Indeed, Bechamp was able to get from the urine of persons who had not taken the drug in any form for a long time alcohol in sufficient quantities to burn it. Lieben found the same substance also in the urine of the dog, the horse, and the lion, and Rajewski §§ in that of the rabbit.

It seems to have been proved, from the results of the foregoing experiments, that alcohol exists in the healthy organism, and therefore the detection of the drug in the different secretions and excretions, after its ingestion, is no proof that alcohol does not undergo oxidation in the economy. It is true that so far no products of oxidation have been found in the blood, but in this case it is reasonable to suppose that the process of oxidation goes on continuously, without interruption, until the production of water and carbon dioxide occurs as the ultimate result of such oxidation.

The elaborate and excellent researches of Ford |||| tend to confirm the theory of the oxidation of alcohol in the animal economy. This investigator studied the subject on the supposition that the sugar manufactured by the liver must, before its final destruction and conversion into carbon dioxide and water, be changed into alcohol. This in mind, he carefully examined large quantities of blood of animals, seeking to obtain alcohol from that fluid by a process of repeated distillation. To prove that the substance obtained from blood in this manner was alcohol, the author employed the chromic-acid test, and relied also on the inflammability peculiar to alcohol, and similarly on the optical appearance of this substance in the conducting tube at the time the distillate began to boil. Again, to prevent possible oxidation of the alcohol during this delicate process, Ford sometimes added sulphuretted hydrogen.

The experimenter then proceeded to examine

* "Tenth Report of the Medical Officer of the Privy Council." London, 1868.

† *Zeitschr. f. Biolog.*, Bd. vii., 1870; and *Schmidt's Jahrb.*, Bd. cliv. S. 261, 1872.

‡ *Boston Medical and Surgical Journal*, p. 347, 1872.

§ *Practitioner*, July, 1874.

‖ *Archiv f. Physiolog.*, Bd. xxiii.

¶ *Journal de Progrès*, t. xi.

** *Loc. cit.*

†† *The Doctor*, February 1, 1873.

‡‡ *Lancet*, 1873.

§§ *Arch. f. Physiol.*, Bd. xi. S. 122, 1875.

|||| *New York Medical Journal*, January, 1872.

various other tissues as substances to be distilled, and here he based his calculations on the amount of carbon taken in and that exhaled, especially in regard to the quantity of alcohol to be found in the blood of the pulmonary capillaries. Thus he determined the quantity of alcohol respectively from the capillary blood of the lungs, from fresh lung-tissue, from putrescent lung-tissue, from fresh thoracic blood, from putrescent thoracic blood, from fresh liver-tissue, and from putrescent liver-tissue.

An examination of the figures given in Ford's original table reveals the interesting and important fact that the smallest quantity of alcohol was obtained from fresh liver-tissue and the greatest amount from putrescent liver-tissue. This appears to show that in the latter instance the glycogen must have undergone fermentation. The same is seen in regard to the quantity of alcohol extracted from fresh and from putrescent thoracic blood.

An unbiassed examination of all the preceding investigations appears to clearly demonstrate that but a very small quantity of alcohol is eliminated as such from the organism. The drug must, therefore, be oxidized in the body, thus serving the purpose of a food and in this manner generating force. This is the case, according to Dupré,* who has shown that one gramme of alcohol oxidized in the organism yields 7184 heat-units, while the same weight of lean beef evolves 1482 heat-units only. The inference is obvious. Further estimates have demonstrated that two ounces of alcohol generates a force equal to that generated by a little over nine ounces of lean beef, this latter being sufficient to maintain the circulation and respiration of an ordinary adult man per day. The results of these calculations seem to be supported by the able experiments of Reichert.†

It must, therefore, be concluded that alcohol, so far as our clinical and experimental knowledge goes, is mainly destroyed in the system, generating vital force, and that it ought to be considered as a food.

Conclusions.

I shall now, to close this imperfect study of the actions of alcohol, give a summary of the conclusions which I have been able to draw, and which will be found scattered throughout the preceding pages. They are as follows:

1. Alcohol in small amounts excites and in large doses depresses both the peripheral motor and sensory nerves.

2. Excessive quantities cause a spiral degeneration of the axis-cylinder of nerve-fibres.

3. Reflex action is at first increased and afterwards diminished by an influence exercised by the drug upon the spinal cord and the nerves.

4. In small amounts the drug stimulates the cerebral functions; it afterwards, especially in large quantities, depresses and finally abolishes them.

5. Alcohol causes lack of co-ordination by depressing both the brain and the spinal cord.

6. In toxic doses alcohol produces hyperæmia of both brain and spinal cord, especially of the lumbar enlargement of the latter.

7. Small doses of alcohol produce increased rapidity of the cardiac beat; large amounts, a depression of the same. In either case the effect is brought about mainly through a direct cardiac action.

8. The drug in small quantities causes a rise of the arterial pressure by a direct action upon the heart; in large amounts it depresses the arterial pressure similarly through a cardiac influence.

9. In large doses alcohol enhances coagulation of the blood; in toxic quantities it destroys the ozonizing power of this fluid, causing a separation of the hæmoglobin from the corpuscles.

10. Alcohol in small doses has little or no effect on the respiratory function; in large amounts it produces a depression of both rate and depth of the respiration through a direct action on the centres in the medulla oblongata.

11. The drug kills by failure of the respiration.

12. On the elimination of carbon dioxide alcohol exercises a varying action, sometimes increasing, sometimes decreasing, such elimination.

13. The action of alcohol on the amount of oxygen absorbed also varies and may be said to be practically unknown.

14. The drug lessens the excretion of tissue-waste, both in health and disease.

15. In small amounts alcohol increases the bodily temperature; in large doses it diminishes the same. The fall of bodily temperature is due mainly to an excess of heat dissipation caused by the drug.

16. Alcohol, in sufficiently large amounts, has a decided antipyretic action.

17. In moderate amounts alcohol aids the digestive processes.

* *Practitioner*, vol. ix. p. 33, 1872.

† *Loc. cit.*

18. Alcohol diminishes the absorption of fats.

19. The drug exercises a varying influence on the amount of urine secreted, but it probably increases the activity of the kidneys.

20. In large doses, or when continuously used for a long time, alcohol produces cirrhotic changes of hepatic especially and paralysis of spinal origin. It also causes insanity, epilepsy, and other maladies.

21. Alcohol is mainly burnt up in the system when taken in moderate quantities, but when ingested in excessive amounts it is partly eliminated by the breath, the kidneys, and the intestines.

22. Alcohol is a conservator of tissue, a generator of vital force, and may therefore be considered as a food.

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NATURE, DIAGNOSIS, AND TREATMENT OF PERNICIOUS ANÆMIA.

READ BEFORE THE PHILADELPHIA COUNTY MEDICAL SOCIETY, MAY 9, 1894.

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WE cannot approach the study of pernicious anæmia in an intelligent manner without first of all determining exactly what group of cases we are to consider under this head; and we shall find that the vagueness of the term has led to not a few misconceptions regarding the natural history, the prognosis, and even the treatment of the disease. The concise and, to this day, most accurate description of the principal features of what we regard as pernicious anæmia, published by Addison in 1843, and more particularly ten years later, is one of the striking evidences of the keenness of this great physician's power of observation. "For a long period," he says, "I had from time to time met with a very remarkable form of general anæmia occurring without any discoverable cause whatever,—cases in which there had been no previous loss of blood, no exhausting diarrhœa, no chlorosis, no purpura, no renal, splenic, miasmatic, glandular, strumous, or malignant disease." And further on, "It makes its approach in so slow and insidious a manner that the patient can hardly fix a date to the earliest feeling of that languor which is shortly to become so extreme. The countenance gets pale, the whites of the eyes become pearly, the general frame flabby rather than wasted, the pulse perhaps large, but remarkably soft and compressible, and occasionally with a slight jerk, especially under the slightest excitement. There is an increasing indisposition to exertion, with an uncomfortable feeling of faintness or breathlessness on attempting it; the heart is readily made to palpitate; the whole surface of the body presents a blanched, smooth, and waxy appearance; the lips, tongue, and gums seem bloodless, the flabbiness of the solids increases, the appetite fails, extreme languor and faintness supervene; breathlessness and palpitations are produced by the most trifling exertion or emotion; some slight œdema is probably perceived about the ankles; the debility becomes extreme, the patient can no longer rise from bed, the mind occasionally wanders, he falls into a prostrate and half-torpid state, and at length expires; nevertheless, to the very last, and after a sickness of several months' duration, the bulkiness of the general frame and the amount of obesity often present a most striking contrast to the failure and exhaustion observable in every other respect." This stands to-day as a faithful and accurate account of the disease; but we have learned that the disease is not always as obscure in its causal relations as Addison believed.

From the stand-point of our present knowledge four groups of cases are clearly distinguishable. Leber, Gusserow, and Channing pointed out the unquestionable relation of pregnancy and lactation to a first group of cases; while in a second the influence of intestinal parasites was clearly demonstrated by Sangalli and other observers in Italy, and by Bäumler, Schönbächler, and others in Germany. More recently a third group of cases has been reported, by the investigations of Fenwick, Nothnagel, Litten, Kussmaul, Henry and Osler, Kinnicutt, and others, in which degenerations of the gastric mucosa play an important part, probably causative, in the disease. Other causes of a less immediate nature, perhaps predisposing, have been assigned, but at least these three groups are definitely known and admitted. There is left a certain number of cases in which no etiological factors are discoverable, but in which the clinical manifestations are practically identical. Is the pathogenesis in these last cases similar or the same as in the first-named groups, and shall we include all four classes under the head of pernicious anæmia? The answer to these questions will, I think, require a little consideration of the nature of the disease as we now know it.

The study of the blood in pernicious anæmia

shows as the most important feature the great reduction in the number of the red blood-corpuscles. In cases of moderate severity there may be 1,500,000 per cubic millimetre, in the most serious as few as 143,000, as Quincke observed the day before the death of one of his cases. This remarkable decrease in the number of red corpuscles must result either from decrease in the production of the red corpuscles, from increased destruction, or from a combination of the two. Now, I intend to show that in pernicious anæmia the important factor is hæmolysis, but that faulty hæmogenesis plays a part; that the gastro-intestinal tract is the seat of the destruction, or at least the source, of the hæmolytic agents; and, finally, that since the four above-named groups are similar in the condition of the blood, in the pathogenesis, and in their pathological tendency, it is more accurate scientifically to place them together as comprising the condition pernicious anæmia. Many modern writers place the apparently causeless cases apart as true "Addisonian pernicious anæmia," regarding the other cases as severe secondary anæmias; but there is much and good reason to believe that all cases are secondary, and there is a manifest advantage in practical medicine in holding to this view and regarding every case as one of obscure anæmia whose nature may be discoverable on close scrutiny. A rooted belief in the idiopathic or essential character of pernicious anæmia cannot but lead to neglect of careful search for hidden causes.

The later and, at the present day, most popular view of the origin of pernicious anæmia is that hæmolysis, or blood destruction, becomes increased beyond the powers of normal hæmogenesis to restore the blood. This view has been advocated by many writers, but none has done so much to bring it to the point of positive proof as Dr. William Hunter. The evidences of hæmolysis are found, in the first place, in the blood itself, in the numerous small, apparently fragmented, red corpuscles, in the decolorized corpuscles, showing merely the framework of the corpuscle, and, I believe, in the poikilocytes themselves. It is difficult to imagine these bodies as resulting from anything but destructive causes; but in themselves they would not constitute positive evidence. There are, however, resulting conditions which indicate the ultimate fate of the coloring-matter and other constituents of the blood-corpuscles after their disintegration. The most important of these, and one which, so far as we now know, is peculiar to pernicious anæmia, is the deposit of iron-containing pigment in the outer zones of the hepatic lobules. This increase of iron in the liver was first observed by Quincke, and later by Rosenstein, Peters, Hunter, Burr and Griffith, Scott, and others, and in some of its features is perhaps characteristic of pernicious anæmia. It results, as Hunter has recently shown, not from the hæmolytic action of the liver itself, but from the storing up of the pigment matter after its liberation in other parts of the portal circulation. The yellow pigmentation of the skin and eyes is doubtless of similar nature. Not only is iron deposited in the liver in excessive quantity, but the amount discharged in the bile is generally increased, and the color of the urine has been found to be deepened by the presence of an altered form of urobilin. The fact that some cases do not show this increased color of the urine does not by any means diminish the importance of the observation when made. Destruction of white corpuscles, which their decreased number might lead us to suspect, is further evidenced, though not absolutely, by the excess of uric acid generally present in the urine; and it may well be that the fever of the disease is due to the same cause. Mott says that his experience warrants him in asserting "a constant relation between the pyrexia, the diminution in the red corpuscles, and the color of the urine." Finally, there is experimental evidence that pernicious anæmia may be the result of active hæmolysis, the anæmia resulting from injection of certain hæmolytic poisons, such as pyrogallol (Silbermann), into animals being strikingly like the natural disease as observed in man. These evidences I believe are sufficient to warrant the belief that hæmolysis plays a most important *rôle* in the pathogenesis of the condition under discussion.

The indications of faulty hæmogenesis are less numerous, though their existence cannot be doubted. In the first place, as Henry has pointed out, the large, flabby, ill-formed macrocytes of pernicious anæmia cannot but convey the impression that they result from some error in blood formation, and surely cannot be regarded as products of hæmolysis.* With these must be ranked the nucleated red corpuscles, whose presence in the blood after hemorrhage, or after rapid blood destruction, is doubt-

* Ehrlich has sought to show by their peculiar reaction to stains that they are degenerative in nature, but the studies of frog's blood by Gabritschewski indicate that the younger corpuscles present this peculiarity rather than the older and therefore more likely to be degenerated.

less an indication of partially unsuccessful efforts at restoration of the normal number of corpuscles. Finally, the lymphoid character of the bone marrow in pernicious anæmia is probably a consequence of the intense blood destruction, and results from the effort to supply corpuscles, as is the case, though to a less degree, in other forms of anæmia. Rindfleisch has studied this subject with particular care, and concludes that there is some obstacle in the way of the extrusion of red corpuscles from the hæmatoblasts of the marrow, which in consequence become greatly increased in number.

We have then, I believe, sufficient evidence to indicate that pernicious anæmia is both hæmolytic and hæmogenetic, but that the former process is the more important of the two.

As to the seat of the hæmolytic changes, we derive most information from those cases in which a distinct causal relation has been determined, and especially from the cases in which the gastro-intestinal tract is the seat of morbid lesions. Of the latter a great number has been recorded, though in some of the earlier cases the diagnosis of pernicious anæmia was not determined with the accuracy we could wish. Fenwick first pointed out a remarkable atrophy of the gastric mucosa and glands; Nothnagel observed cirrhotic contraction with disappearance of the glands; Nolen described a form of interstitial gastritis with atrophy of the glands; ulcers of the duodenum and stomach were found by Zahn and Litten; Homolle found simple duodenitis; while Banti, Sasaki, and others described changes in the sympathetic nerves and in the ganglia of the stomach walls. In the case of some of these lesions it may properly be urged, as has been done, that the anæmia was the cause of the gastric changes rather than the reverse; but in such instances as those of cirrhotic thickening of the stomach, with destruction of the mucosa, this explanation does not suffice. In a recent case under my own observation there was a history of marked gastric trouble for fifteen years, during which the patient remained in a fair state of health. Finally, the patient began to grow more anæmic, her blood and general appearance assumed the characters seen in pernicious anæmia; and on subseqent examination of the stomach a marked degree of cirrhosis, with partial destruction of the tubules, was discovered. Surely in a case of this kind the gastric lesions could not be regarded as secondary to the pernicious anæmia. The morbid conditions of the intestines with which pernicious anæmia has been found to be associated are similar to those in the stomach; but attention has been directed more particularly to the influence exerted by intestinal parasites, particularly the *Bothriocephalus latus* and the *Anchylostomum duodenale*. In a few isolated cases other parasites were found,—*Ascaris lumbricoides* (Demme) and *Tænia saginata* (Eisenlohr),—but in these the diagnosis of pernicious anæmia is open to some doubt.

The manner in which these gastric and intestinal lesions bring about the anæmic condition of the blood must still be regarded as an open question, though we have undoubtedly reached a point where some measure of positiveness is justified. In the first place, it is, I believe, definitely ascertained that pernicious anæmia is a hæmolytic disease to a great degree, and that we cannot, therefore, regard the operation of the lesions described as being merely that of causes which interfere with proper nutrition. This may be a factor, but it is surely not the important one. Clinical observations and latterly experimental evidence, on the contrary, point to the development and action of poisonous substances within the intestinal tract, which by their hæmolytic action outrun the blood-making powers. A remarkable case of Sandoz may be cited in this connection. This observer records an instance of marked and progressive anæmia, in which there were prominent gastric symptoms and great fetor of the breath, and which showed decided improvement in the gastric conditions, the breath, and the anæmia after repeated lavage of the stomach. A similar case has recently been reported by Meyer. Jürgensen observed a similarly pertinent case, in which marked anæmia rapidly disappeared after administration of purges and the discharge of immense numbers of the Bacterium termo. The question of the relation of the animal parasites of the intestines to the anæmic condition is less easily determined than that of such organisms as bacteria, but there is much in favor of the view that it is by the generation of hæmolytic poisons, either in their natural growth or, as Schapiro claimed, from their death and decomposition. The belief that the anchylostomum causes anæmia by the abstraction of blood was attractive at first sight, but there are recorded cases of marked pernicious anæmia in which the worms were far too few to account for more than a trifling loss of blood. In addition, the discharge of the parasites is often followed by such rapid improvement in the symptoms that the conclusion that some source of intoxication has been removed seems well-nigh irresistible.

Finally, the important experiments of Hunter furnish additional evidence, in showing the active part the gastro-intestinal tracts may play in blood destruction when hæmolytic agents are administered. The poison employed by him was toluylendiamin. After injection of small doses the blood of the splenic vein alone showed hæmolytic changes; after large doses that of the mesenteric veins was also affected; and when the spleen had been removed, the chief hæmolysis was exercised in the intestinal circulation. Whether or not the spleen would play the secondary *rôle* in case of administration of poisons through the stomach must for the present remain conjectural. Enough is shown, however, to prove the importance of gastro-intestinal intoxication in its relation to hæmolytic anæmia.

Thus far we have considered only two of the groups of pernicious anæmia. The study of the puerperal cases is less satisfactory. No definite organic lesions have as yet been determined in these, and as a discussion of their nature could only be theoretic, they may be left out of consideration for the present. Suffice it to say that in this group, as well as in those cases in which no etiological factors of any kind are discoverable, there are the same indications of active hæmolysis in the blood, the secretions, and the organs as in the gastro-intestinal forms, and the clinical features are identical.

The *rôle* of hæmogenesis in pernicious anæmia, though of secondary importance and sequential, is doubtless an essential one. There must be some reason for the different effect of the same lesion in different individuals. Some persons may harbor the bothriocephalus or anchylostomum for years without the development of any unusual anæmia, just as certain persons manifest only gastric symptoms as a result of marked gastric atrophy. This difference in the state of the blood, I believe, depends more upon acquired or native deficiency in the hæmogenetic powers than in any obscure differences in the lesions themselves. This theory would furnish a ready explanation, as has been claimed by D'Espine and Picot, for the rarity of pernicious anæmia in children, in whom hæmogenesis, in common with other reparative processes, is more active than in older persons. It would harmonize with the clinical observations such as those I have cited before in the case in which pernicious anæmia was developed only after many years of gastric disorder and disease, and then ran a rapid course. Another interesting observation pointing to a natural deficiency in hæmogenesis was reported some years since by Luzet. A girl who had been under the care of Jaccoud for chlorosis recovered entirely, but four years later, after her second confinement, came under the notice of Luzet with 781,200 red corpuscles to the cubic millimetre, and with a relative hæmoglobin value of 1.091. Doubtless, as Luzet claims, the disease was now pernicious anæmia. The previous chlorosis with subsequent pernicious anæmia are strong indications to my mind that there was here some original defect in the blood-making powers. Dr. Henry, in commenting on the above case, remarks that he had observed exactly the same conditions in one of his cases.

Diagnosis.—Before proceeding with the diagnosis it is important once more to set clearly before the mind the conception of pernicious anæmia which we have arrived at,—viz., that it is a form of intense oligocythæmia with a tendency to progressive deterioration, and certain definite symptoms, altogether irrespective of our ability or inability to find a distinct cause. The diagnosis, then, turns upon the character of the blood and the general symptoms, and not at all upon the absence or presence of etiological factors.

In an historical review of the study of the blood in pernicious anæmia we find a succession of observations each of which was in turn regarded as pathognomonic of the disease. One of the striking features on examination of the blood is the great irregularity in the shape of the red corpuscles,—the condition to which the terms poikilocytosis (Quincke) and schistocytosis (Ehrlich) have been applied. This was first found by Damon ("Leucocythæmia," Boston, 1864) in leukæmia, but was subsequently claimed by Quincke to be characteristic of pernicious anæmia. That this is not the case has been abundantly proved by the detection of marked poikilocytosis in cases of advanced carcinoma of the stomach, chlorosis, and other diseases. No more characteristic is the great difference in size of the red corpuscles, the existence of macrocytes and microcytes, and in particular of the small red cells of bright color and high refraction to which Eichhorst called attention in his work on pernicious anæmia, and which for a time were regarded as characteristic. All of these conditions are found in other intense anæmias, though, like poikilocytosis, less frequently and less distinctly than in pernicious anæmia. Another feature which has been falsely interpreted as pathognomonic is the mobile or amœboid character sometimes seen in the red corpuscles, but which has also been found in other diseases. The nearest approach to a characteristic condition is the rela-

tive excess of hæmoglobin, to which Hayem and Laache called particular attention. According to these authors and others after them, the blood of pernicious anæmia shows great reduction in the number of the red corpuscles without an equal decrease of hæmoglobin; so that the individual corpuscle is too rich in coloring-matter, though, of course, the actual decrease of hæmoglobin is very considerable. The presence of these conditions is doubtless practically diagnostic, but unfortunately we do not always find a relative richness in hæmoglobin. In four out of five cases of undoubted pernicious anæmia in which I have recently examined the blood, the reverse was the case, though the reduction of hæmoglobin was never much in excess of that of the number of corpuscles. The same observation was made in cases reported by Brakenridge, Dehio, Demme, and others. In all cases of genuine pernicious anæmia, however, the reduction in number of the red corpuscles is very considerable,—usually below 1,500,000. In two cases which I have recently examined, the examination of the blood showed 900,000 (eighteen per cent.) red corpuscles with ten per cent. of hæmoglobin, and 800,000 (sixteen per cent.) with thirty-five per cent. of hæmoglobin respectively. As a contrast to these figures I may cite the average result of the blood-examination in one hundred consecutive cases of gastric, intestinal, cardiac, nervous, pulmonary, and intestinal diseases, in which a certain degree of pallor led to examination of the blood. The average number of red corpuscles was 4,430,000 (88.6 per cent.), the average worth of hæmoglobin seventy-four per cent. The average of the five most anæmic of these cases was 3,820,000 (76.4 per cent.) red blood-corpuscles with 49.4 per cent. of hæmoglobin. In cases of gastric cancer the degree of anæmia, judging by the pallor of the skin, is often quite as marked as in bad cases of pernicious anæmia, but in three advanced cases I found the average result 2,890,000 (57.8 per cent.) red blood-corpuscles and thirty-one per cent. of hæmoglobin. In the four most decided cases of anæmia due to cardiac and arterial disease I have examined, the average was 4,210,000 (84.2 per cent.) of red corpuscles and forty-seven per cent. of hæmoglobin. In no case of the whole series were the red corpuscles reduced below 2,300,000, or forty-six per cent., and in none was there relative excess of hæmoglobin. The contrast between these figures and those given for pernicious anæmia is so striking as to need no further comment. Finally, Ehrlich has insisted upon the diagnostic significance of large red corpuscles containing nuclei, structures for which he proposes the name megaloblasts. These corpuscles, however, are not invariably present in pernicious anæmia, and they have been observed in other diseases attended with severe anæmia. I have seen them well marked in a case of purpura with large hemorrhages.

It is clear, therefore, that no one of the characters cited is pathognomonic standing by itself. On the other hand, a combination of all of them would make the diagnosis practically certain. In particular, I would urge that too much importance has been attached by physicians to poikilocytosis, one of the least important of the abnormalities named. What characters, then, can we regard as significant? My own observation leads me to regard as pernicious anæmia any case presenting suspicious clinical features in which the red corpuscles number less than 1,500,000 per cubic millimetre, and in which the hæmoglobin shows about the same proportionate reduction. The diagnosis becomes certain in cases in which the hæmoglobin is relatively in excess, and in which great alteration in the size and shape of the red corpuscles and the presence of large nucleated red corpuscles are observed. In addition to these characters of the blood, pernicious anæmia presents a train of clinical manifestations scarcely to be mistaken when present in their typical form. These symptoms have been so well described in the paragraph quoted from Addison that nothing further need be said on this head.

Differential Diagnosis.—Pernicious anæmia must be distinguished from cases of secondary anæmia, so called, especially from gastric cancer, and from chlorosis. In certain cases the striking symptoms from first to last refer to the heart or the nervous system, and may draw the attention away from the real disease.

The anæmia following hemorrhage is often intense, and the patient's face may have a deathly pallor; rarely, however, or never, in my experience, does it show the lemon color so frequently seen in pernicious anæmia. There is absence of the marked gastric symptoms and generally of the fever. It must be confessed that this last symptom is sometimes present in the anæmia of large hemorrhage, but it is exceptional. The history of the case leaves little doubt, pernicious anæmia rarely coming on abruptly. In any case, however, whether the anæmia had an acute onset after a large hemorrhage or a gradual development from repeated small hemorrhages, as in ulcer of the stomach, uterine or rectal hemorrhages, the character of the blood is sufficiently different

to make a positive diagnosis. In acute post-hemorrhagic anæmia the blood rarely shows less than 2,500,000 corpuscles and the hæmoglobin is rarely below forty per cent., death resulting in cases where greater loss of blood has been sustained. In cases of repeated bleeding the blood-count may be lower, but the hæmoglobin in these cases is nearly always disproportionately diminished. Blood-counts below 1,000,000 are exceedingly rare in such cases, as they are very common in pernicious anæmia.

The similarity in their clinical manifestations of some cases of gastric cancer to pernicious anæmia has often been remarked. The differential diagnosis is especially difficult in cases where the cancer is small and occupies the posterior wall of the stomach. In these the absence of a palpable tumor and of rapid emaciation makes the diagnosis often uncertain, as in the following case.

Case I.—Mr. X., aged about sixty-three, had been ill for some time, complaining of gastric distress after eating, great weakness, and progressively increasing pallor. He never vomited, except occasionally after some distinct dietary indiscretion, and at such times the vomited matter presented no characteristic features. The patient came under my observation some months after his illness grew severe enough to prevent his continuing at his usual occupations. He was then decidedly pallid, the color being waxy,—neither the sallow hue of cancerous cachexia nor the lemon yellow of pernicious anæmia. He was somewhat, but not greatly, emaciated. The symptoms had grown decided, but no new ones developed. There were occasional elevations of the temperature to 99.5° or 100.5° F. in the evening. Physical examination revealed no thickening or induration in the region of the stomach. The stomach was not at all dilated. There was no pain at the stomach,—at most, discomfort after food. The examination of the blood showed 3,200,000 red blood-corpuscles and forty per cent. of hæmoglobin. The disease continued without much change of symptoms, but after four months a decided induration could be detected in the epigastrium, and after death, which soon followed, a small tabular, scirrhous carcinoma was found in the posterior wall of the stomach, near the pylorus, but not obstructing it. The stomach was not dilated.

The diagnosis in cases of this description is manifestly very difficult, and it will be seen how great a service was rendered by the blood-examination. The presence of a certain degree of emaciation was really the only point of service in the diagnosis, and this cannot be regarded as of great significance, as will be seen in the next case; neither was the absence of the lemon hue of the skin a certain indication. It may be fairly urged that the examination of the blood alone could be relied upon in instances of this kind.

A second case may be cited in which the symptoms of pernicious anæmia resembled those of cancer of the stomach. This case occurred in the practice of Dr. John Boger, with whom I saw it.

Case II.—Mrs. X. Y., aged forty-seven years, ceased to menstruate three years previously. Her illness began apparently a year and ten months previous to her death and continued, with a single break of three months, progressively until her death. From the first she complained of marked gastric disturbances, especially vomiting. The matters ejected were reported to have been dark-colored, sometimes like coffee-grounds and at other times greenish, but there was never distinct blood. Dr. Boger never saw it otherwise than as yellowish or greenish liquid containing much mucus. The amount of vomiting was remarkable, often being repeated fifteen times during the day, and the average number being five times daily. The patient grew very weak, complained that she felt as if her heart was not beating, but did not have much actual dyspnœa or palpitation. She was habitually constipated. She is reported to have lost a great deal in weight (sixty pounds), but when I saw her a few weeks before her death she was not apparently emaciated; on the contrary, I noted the persistence of considerable subcutaneous fat, and the face was distinctly fleshy. The color of the skin and conjunctivæ was lemon yellow, the patient was weakened to the last degree, and the heart was extremely feeble, the sounds being muffled and toneless; a systolic murmur could be detected at the base and in the cervical vessels. The urine which was shown me was light in specific gravity, but darker than normal. The examination of the blood showed 800,000 red blood-corpuscles and thirty-five per cent. of hæmoglobin. Physical examination of the abdomen discovered a degree of resistance in the epigastrium, with some tenderness, but no definite tumor. The stomach was not at all dilated. She died soon after, but autopsy was not obtained.

In this case the onset of the disease, the persistence of marked gastric symptoms, and the rather characteristic vomiting warranted the suspicion of cancer of the stomach, and yet

in the later stages the appearance of the patient was enough to dispose of this diagnosis. The flabby fat with the lemon hue of the patient in themselves were strong points, for never, in an experience embracing quite a large number of cases of gastric cancer, have I seen the fat anything near so well preserved, and the yellowness of the skin in this case was very unlike the color we see in cancer, even when the liver is involved. With the examination of the blood the diagnosis was certainly unquestionable. Examination of the stomach contents could have given no reliable information, for free hydrochloric acid is frequently absent in pernicious anæmia, and the constant presence of this sign, even in cancer of the stomach, may be doubted. The slight induration in the epigastrium may have been due to a variety of causes, such as thickening of the walls of the stomach by interstitial gastritis, old gastric ulcer, and the like. It was not sufficient to constitute any evidence at all in favor of cancer, and probably was similar in nature to that found in a case of Dr. William Pepper's which I had the opportunity to examine recently during life and post mortem. In this instance the symptoms were almost identical with those in the case detailed, excepting that the vomiting was less pronounced and the vomita never brown in color. The blood-examination showed 900,000 red corpuscles and ten per cent. of hæmoglobin. There was the same induration in the epigastrium, and this was found, post mortem, to be due to thickening of the walls of the stomach near the pylorus, probably in some measure the result of an old healed ulcer, but largely to a diffuse cirrhosis.

The history of these cases illustrates rather well the points by which the two conditions—cancer of the stomach and pernicious anæmia—are to be distinguished, but one or two have not been alluded to. Not infrequently in the latter affection patients complain of discomfort or even considerable distress at the stomach, but rarely of the severe pain of carcinoma; and a tumor cannot, of course, be detected. In cases, however, where these distinct signs are absent, I should place most reliance on the presence of marked emaciation, of an ashy or sallow hue of the skin in place of a yellow tinge, and on the evidence of dilatation of the stomach. The character of the vomited matters and the presence or absence of free hydrochloric acid give us little assistance. Evening rises of temperature are more common in pernicious anæmia, but may occur in either. Finally, the examination of the blood is of signal importance. Rarely in carcinoma do the corpuscles fall below 2,000,000, and the hæmoglobin is disproportionately reduced.

Chlorosis and pernicious anæmia would, at first sight, appear easily distinguishable, as, indeed, they are in most cases. There are some instances, however, of inveterate chlorosis in which the blood becomes progressively poorer and which eventually resemble pernicious anæmia very closely. This difficulty would be most marked in cases of *chlorosis tarda* or chlorosis in later life. Ordinarily, the great reduction in hæmoglobin with little diminution in the number of red corpuscles, together with the absence of marked poikilocytosis and of macrocytes, microcytes, and nucleated red corpuscles, render chlorosis easily recognizable. It is a mistake, however, to believe that the number of red corpuscles is never much reduced, as two recent cases of my own would prove. In one the examination showed 2,700,000 red blood-corpuscles with thirty per cent. of hæmoglobin; in the other, 2,270,000 red corpuscles and twenty-two per cent. of hæmoglobin. Even lower counts than this have been recorded. The age of the patient, the sex, the prominence of menstrual disturbances in many cases, and the absence, as a rule, of fever, usually give material aid in the diagnosis. In any case, however, in which the blood-count falls below our standard for pernicious anæmia (1,500,000 red corpuscles per cubic milimetre), and in which the reduction of hæmoglobin ceases to exceed that of the corpuscles, a transformation into pernicious anæmia might properly be suspected.

Reference has been made to the prominence of nervous symptoms in certain cases. This has been suggested prominently by the observation by Lichtheim, and after him by Minnich, Burr, and others, of organic changes in the spinal cord in this disease. The changes noted have been, in the earlier stages, small areas of hemorrhage or extravasation of blood, similar to those seen in the retina and in the serous surfaces, and in the later stages of system degenerations, especially in the posterior columns. The latter changes are probably in no way connected with the small hemorrhages. Unfortunately for diagnosis, these changes occur in other anæmic diseases, and the resulting symptoms are, therefore, of no value in diagnosis. In three cases I have examined, there was complete absence of the knee-jerk, and in two of them other symptoms which drew attention prominently to the nervous system.

Case III.—Mr. O. B., a shoemaker, aged fifty-five years, came under observation complaining of progressive weakness and pallor and

of gastric disturbances. His illness commenced three months or more previous to my first visit, and made steady progress. The patient's habits were good, he had never contracted syphilis, and had never been seriously ill. He complained of pain in the region of the stomach, especially after eating, and occasionally he vomited. I was at once struck by the man's general appearance and by his gait. He walked rather slowly, with the legs far apart, and brought his foot down upon the ground flatly, as in locomotor ataxia. Sensation was somewhat slow in certain areas about the soles and the dorsum of the foot. The knee-jerks were entirely wanting and station was uncertain. There was no pain excepting in the stomach after food. The pupils responded normally in accommodation and to light. His face wore an habitual heavy, melancholy expression very like that in paralysis agitans, and, indeed, there was frequently a tremor in either thumb and forefinger, as in that disease. His mind was sluggish, and he could be aroused to interest in matters about him only with great difficulty. He was rather fleshy, the tissues being soft and flabby. His color was dead white, though for short periods it would assume a somewhat yellow appearance. The earlier examinations of the blood were unfortunately lost, but after some improvement in color and decided improvement in his general symptoms had taken place, the examination showed 2,000,000 red corpuscles and thirty per cent. of hæmoglobin. The patient first came under observation in May. In August he had retention of urine and had to be catheterized; subsequently cystitis developed. In spite of this, however, he improved slowly and presented a quite healthy appearance, and was free of the gastric symptoms the following winter. In the spring of the following year he again became anæmic, and afterwards passed from my observation.

In the second case there was loss of knee-jerks, somewhat ataxic gait, impaired station, and areas of diminished sensation in the skin of the feet and legs.

There may thus be marked nervous symptoms, due, no doubt, to changes in the spinal cord, but these symptoms never dominate the disease, and would not, therefore, obscure the diagnosis. In like manner, cardiac weakness, palpitations, or dyspnœa may be prominent symptoms, but their connection with the anæmic state is rarely doubtful.

Treatment.—The tendency of pernicious anæmia to a fatal issue must not lead to any laxity in treatment, for it is well known that temporary improvement may often be brought about, lasting a few months or even years, and permanent cure seems to have been attained in some cases.

Byron Bramwell rendered a great service to medicine in calling attention to the value of arsenic in this disease. Sometimes the rapidity of the improvement following the use of this drug stamps it as almost a specific; in other cases, however, it seems entirely powerless. It is best given in the form of Fowler's solution, beginning with 2-drop doses and rapidly increasing to 10 drops, then more slowly to 15 or more. The remedy should always be given after meals. Frequently I have hesitated to administer it on account of gastric disturbances; but I have more often found in these instances that the gastric symptoms subsided after the drug was given than the reverse, and this has been the experience of others. It is true, however, that the stomach sometimes will not tolerate Fowler's solution or pills of arsenous acid. In urgent cases it may then be used hypodermically, but generally proves somewhat irritating. Under no circumstances should arsenic he pushed so far as to produce diarrhœa or other gastro-intestinal symptoms, as the loss of ground from an attack of diarrhœa may more than counterbalance the gain secured by weeks of judicious treatment. The tolerance of the drug is sometimes remarkable, but there is little need of increasing the dose beyond 15 drops, even when it is well borne. The value of arsenic in pernicious anæmia has been a little too well recognized, for it has at times led to a neglect of other measures almost as essential.

The patient should always at first be confined to bed, and should be required to use the bed-pan and urinal. The diet should be nutritious and easily assimilable. Meats should not be given too freely, on account of the diminished secretion of hydrochloric acid; nor, on the other hand, should sugars or starchy food be allowed in large quantity, from their tendency to fermentation. Symptomatic treatment is generally required to aid digestion and to allay gastric irritation. For the former purpose hydrochloric acid is often essential, and should always be tried where gastric fulness and fermentation are complained of. Where vomiting is severe I have found that small doses of bismuth subnitrate (5 grains) with cocaine ($\frac{1}{80}$ to $\frac{1}{12}$ grain) act more happily than any other remedies; and it has seemed to me that arsenic could be administered more freely and continuously with than without these adjuvants. They are best administered some time before the meal.

Our knowledge of the pathology of the dis-

ease would indicate that measures should be taken to prevent putrefactive changes in the stomach and intestines and to minimize the absorption of poisons from this source. In the remarkable case of Sandoz the good effects of lavage of the stomach were most apparent, and Kaufmann and others report similar results.

Aside from the question of its influence on the disease itself, lavage may prove of great advantage in controlling obstinate vomiting and in improving the digestive power. There will generally be some difficulty at first, but after the patient has grown somewhat accustomed to the tube the stomach may be flushed every few days with little disturbance. In cases where gastric atony seems prominent and the patient's appetite is poor, bitters may be given with advantage before meals.

Intestinal lavage has been less frequently practised, and has not as yet yielded definite results. If, as has been claimed, the small intestines may be flushed out by high injections, there is reason to hope for some advantage from this method of treatment, and in the later stages of the disease it would be of additional service in supplying a certain amount of fluid to the empty vessels. The use of intestinal antiseptics, such as salol, naphthol, and carbolic acid, has been highly lauded, but the results are thus far uncertain. Free use of purgatives is distinctly less advisable than in chlorosis, excepting in the cases of parasitic pernicious anæmia. There is always the danger of deranging the stomach and of adding to the weakness of the patient. Enemata or suppositories will generally be sufficient for the purpose of securing action of the bowels, and beyond this we should not attempt to go.

Sooner or later in pernicious anæmia there comes a time when the deterioration of the blood, for which the excellent term *cachæmia* has been suggested, reaches such a grade that remedies seem altogether powerless. In this stage I have felt that the patient suffers quite as much, if not more, from the decreased quantity of the blood in circulation or from its inability to circulate freely. At this stage measures directed to assist the circulation are even more essential than arsenic. Of these measures not the least powerful is systematic massage. The interesting investigations of John K. Mitchell have shown very pointedly the effect of massage in putting larger masses of blood into circulation, and in pernicious anæmia less than in any other condition can the system spare any portion of the blood to rest idly in the tissues. A still more advanced case would call for injections of water or of blood. The safest and perhaps the best method would be the hypodermic injection of normal salt solution in large quantities (two pints to two quarts). The intestinal flushings of which I spoke before might be of assistance here, but they could hardly prove as satisfactory as hypodermoclysis. The transfusion of blood itself has been practised by a number of investigators, and some, as Brakenridge, report remarkable improvement following the operations. It is doubtful, however, if blood-serum or blood has any great advantage over salt water, and certainly the danger of fibrin-ferment intoxication and other accidents would deter us. The administration of dried blood by the rectum possesses no special advantages.

In cases of pernicious anæmia in which improvement is seen to be taking place the treatment should be continued with great care. Under no circumstances should the hygienic and dietary regulations be relaxed or the use of arsenic discontinued. As in chlorosis relapses are frequently due to the neglect of the use of iron as soon as the patient's color is normal, so in pernicious anæmia I believe the intervals between recurrences could be materially lengthened, and perhaps permanent cure more frequently attained, by the unbroken administration of arsenic. During convalescence also I have found iron to be a valuable adjunct to arsenic. In the earlier stages of the disease, however, it is not only of no value, but often disagrees decidedly.

One word in conclusion. It seems to me that the best classification of the anæmias should assign to pernicious anæmia all cases in which the deterioration of the blood has reached the point I have indicated, whether a cause be found or not. This seems reasonable, because we have in all forms of severe anæmia presenting the features of pernicious anæmia the same evidences of great hæmolysis and defective hæmogenesis, and clinically the same tendency to further deterioration of the blood, whether the anæmia is secondary to gastro-intestinal disease, to pregnancy and parturition, or apparently quite causeless. In the last group of cases no doubt similar causes will some day be found. According to this view, we look upon pernicious anæmia as a symptomatic condition, a high degree of *cachæmia*, which experience shows is a condition of great gravity, and which tends to grow worse. We are thus constrained to consider the diagnosis incomplete until the cause of this cachæmia is discovered, and the treatment requires attention to the underlying causes as much as to the blood itself.

AN ADDRESS ON APPENDICITIS.

Delivered before the Surgical Section of the College of Physicians of Philadelphia.

By J. William White,
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IT has been my intention in preparing this paper merely to review some of those important points relating to the cause, course, and diagnosis of appendicitis, and more especially to its treatment, about which great differences of opinion still exist in the profession, and to make my own slight contribution towards the acquirement of a fulness and certainty of knowledge which will permit us at some future day to lay down certain broad general propositions accepted and endorsed by both surgeons and physicians. The divergence in the views at present advanced is extraordinary. If the disease were a rare one, met with by but a few consultants and requiring special technical skill for its investigation, the reason for this want of agreement would seem evident. That we do not know to-day whether purpura hemorrhagica is a disease of the blood or blood-vessels or of the nervous system is not strange. Few of us have seen fatal cases, still fewer have had an opportunity to make autopsies or blood examinations in such cases. But there is scarcely a practitioner of five years' standing in any part of the world who has not seen and treated inflammation of the vermiform appendix, and the sum total of professional experience is already so enormous that one would think it amply sufficient to resolve all doubts and to place the guiding principles of diagnosis and treatment upon a firm scientific basis.

On the contrary, it is scarcely an exaggeration to say that attentive perusal of the voluminous literature of the last ten years, beginning with the papers of Treves and of Fitz and ending with those now in process of publication, will demonstrate that there has been made scarcely one single statement as to the essential etiology, the pathognomonic symptoms, or the appropriate treatment which has not been flatly, often violently, contradicted.

This condition of affairs reflects but little credit on the profession, and certainly renders it proper that at short intervals we should pause, review and weigh the existing evidence, and strive for the common ground of agreement which is sure to be reached sooner or later.

I shall consider only the broader questions involved, selecting those about which there are unavoidable uncertainty and anxiety and equally unavoidable differences of opinion at the bedside. I shall illustrate clinically only from my own experience.

The valuable papers of Fowler, Richardson, and Treves are still so recent and so exhaustive that my chief function must be to present for your criticism the conclusions at which I have myself arrived, and my reasons therefor.

As regards etiology, we may first consider (*a*) the *predisposing* causes. The explanation of the great frequency with which the appendix becomes the seat of inflammatory and destructive lesions as compared with the other portions of the digestive tract is undoubtly to be found in its embryology and in its anatomical relations. There can be no question that those structures which remain to us as functionless vestiges of parts once useful in our prehistoric ancestors are possessed of low vitality and but feeble resistant powers. This is as true in the life of the race as in that of the individual. It doubtless explains in part the special susceptibility of the appendix to inflammation, as it does that of the uterus and the female breast to cancer during the post-sexual period of life.

In addition, its dependent position, its communication by an orifice, often more or less narrowed, with that portion of the intestine in which inspissation of intestinal contents first occurs, while at the same time it is removed from the direct fæcal current, all appear to be conditions so markedly predisposing to inflammatory attacks that we need look no further for a sufficient explanation of the extraordinary frequency of appendix trouble.

(*b*) *Exciting Causes.*—Putting aside the comparatively rare cases in which tubercular or other general disease localizes itself in the appendix, we have two chief classes of exciting agencies, clinical differentiation of which is to be earnestly aimed at: the *mechanical* and the *bacterial* or *infective*. The latter comes into play usually, perhaps almost constantly, as a sequel of the former, which may, I believe, exert its action alone from first to last in a given instance, and does so in many cases.

The following anatomical points must be remembered. The appendix is commonly found curved upon itself, because its mesentery, derived from the inferior layer of the mesentery of the ileum, is too short for it. In the fœtal type of the cæcum and appendix the latter has a mesentery which runs to its tip, but in the majority of adults it ends about the centre of the appendix or at the junction of its middle and distal thirds. Along the free concave border of the mesentery runs a single vessel, a

branch of the ileo-colic, and from this branch the appendix, as a rule, derives almost its entire blood-supply. Another peritoneal fold runs from that part of the ileum most remote from its mesenteric attachment and is united with the mesentery of the appendix. It carries no blood-vessels. It is the remains of the *true* mesentery of the appendix (Treves). It is interesting to note the fact that in the different types of cæcum found in our species, those which involve a disproportionate growth of the cæcum show that it derives its peritoneal covering partly at the expense of the mesentery of the appendix, which becomes more and more scanty and more vertical in direction the larger the relative size of the cæcum.

We here have the factors which enter into the production of a large number of cases of appendicitis. Distention of the ileum with gas, or of the caput coli with gas or fæcal matter, will cause dragging on one or the other of these folds, already too scanty, increase the torsion of the appendix, interfere with the blood-supply through its single vessel, and, according to the degree of torsion, produce congestion and tumefaction, catarrhal inflammation, ulceration or gangrene, with the clinical symptoms that belong to each. The anatomical conditions are so simple and easily understood, and explain so completely various well-known types of the disease, that it seems to me we may assume them to be sufficient in many cases to account for all the symptoms.

The importance of the matter will be apparent if we remember that it has been asserted that all cases of appendicitis are infectious in their nature, and that from this assumption has followed the corollary that all cases should be operated on, as one attack would mean almost certainly another at some future time.

It seems probable, though hardly yet proved, that the *bacterial* cause of appendicitis is, as a rule, the bacterium coli commune, perhaps the most interesting micro-organism that is being studied at the present day. It is almost invariably to be found in the intestinal tract, and seems in the presence of sound mucous membrane to have little or no power for evil; but it is equally well demonstrated that if the epithelium is once destroyed it has both pathological and pyogenic properties.

Experiments have shown that even a moderate degree of constriction of the intestinal canal may be followed by the penetration of its wall by this bacterium, and also that its virulence is much increased by the presence of irritative conditions such as exist in advanced constipation or marked diarrhœa, even when produced experimentally by opium or by tartar emetic.

Other micro-organisms are exceptionally associated with acute appendicitis, but the most reliable observations seem to show that in eighty-two per cent. of infective cases this bacterium is the active agent (Tavel and Lanz).

A third class of causes which may be regarded as both predisposing and exciting must be made to include fæcal concretions and foreign bodies. The latter, once thought to be the chief factors in producing the disease, are now known to be of great rarity, occurring in only about four per cent. of operative cases (Matterstock, Fowler). Fæcal concretions are found in fifteen to twenty per cent. of such cases, and there is evidence to show that they may occasionally, by their presence, give rise to the lesion of the mucous coat which precedes infective processes; but they are so often absent in cases of all grades of severity, and so often present in autopsies on persons who have died from other diseases, that they should not be considered of primary importance.

The effect of age must be taken into account in summing up the etiological factors. It is certain that the two extremes of life are notably exempt, but the explanation of this fact is thus far purely theoretical.

It is asserted that in very early life the funnel-shaped appendix, apex downward, offers fewer opportunities for the formation and retention of masses of inspissated fæces, while in old age atrophy of the mucous membrane about the cæcal orifice of the tube again widens it; but we lack positive knowledge upon these points. The very existence of the fold of mucous membrane known as the valve of Gerlach is disputed, and in any event it is so imperfect mechanically as to be presumably of slight importance.

The disproportion between the sexes requires explanation. If we accept the usual description of the anatomy of the parts concerned, there seems to be no good reason why appendicitis should be found in males four or five times more frequently than in females; but if future observation confirm the assertion of Clado, that a fold of peritoneum passes from the right ovary to the meso-appendix—the appendiculo-ovarian ligament,—and if this fold carries a blood-vessel, an obvious, and it seems to me a sufficient, explanation has been found. It has been shown (Bryant) that the male appendix is four-tenths of an inch longer than that of the female; that its calibre is slightly larger; and, possibly as a result of the latter fact, that it

contains fæcal concretions in a larger percentage of cases. But these circumstances do not seem to throw much light on the subject.

The manner in which constipation, or diarrhœa and digestive disturbances generally, favor the development of appendicitis is now evident. We have a vestigial structure of relatively poor vitality and low resistant power, so situated mechanically that its one source of blood-supply is greatly interfered with by twisting or dragging, and connected by short and scanty folds of serous membrane with portions of the digestive tract especially liable to changes of form and size which thus easily produce such torsion or tension. Furthermore, a micro-organism capable of great virulence if epithelial exfoliation occurs or if any area of lessened resistance exists is almost constantly present.

Clinical Classification.—Thus far, while there are minor differences of opinion, we are in the main on safe ground; but when we come to take the next step the lack of definite knowledge becomes painfully apparent, and we must, as it were, feel our way with caution.

How are we to recognize clinically the cases in which the mechanical element alone is the factor and the circulatory disturbance stops short of the production of necrotic lesions of epithelium, mucous membrane, or appendix wall?

If the views advanced as to etiology are sound, not only do such cases occur, but they probably outnumber the more serious forms of the disease, frequent as are the latter. Statistics support this view, as there is good reason to believe that from sixty per cent. to eighty per cent. of cases of appendicitis recover without operation, and in the majority of these an infectious element must almost certainly be absent. Nor do the facts bear out the assertion so often made recently, that such recoveries are merely apparent or temporary. Every medical man who has had a large practice for the past decade—*i.e.*, since the knowledge of this disease has become so wide-spread (thanks to the labors of Treves, Fitz, Bull, McBurney, Weir, and others)—could disprove this statement from his own experience, unless a period of freedom of from five to ten years is not sufficient to establish permanency of cure. The all-important question to be settled at the present day is how to recognize such cases at the bedside.

If we review the early symptoms of a typical case of so-called mild or catarrhal appendicitis, and assign each to its anatomical or pathological cause, it is discouraging to find that thus far we have at this stage practically no means of distinguishing the cases which are going to stop short of grave organic lesion from those which, unless cut short by surgery, are predestined to almost certain fatality; and yet the review of such symptoms cannot be regarded as valueless, as only in this way, as time goes on, can we hope to reach diagnostic accuracy.

Let us suppose that we have a case in which constipation (which has been obviously or unsuspectedly present in ninety per cent. of my cases) or diarrhœa, or at least some digestive derangement, has caused intestinal distention with fæcal matter or with gas, or irregular and excessive peristalsis in the ileo-cæcal region. The meso-appendix is dragged upon, the torsion of the appendix increased, the return of blood interfered with; the arterial supply, more difficult to disturb than the venous current, is but little affected. If we could see such an appendix we would undoubtedly find swelling and congestion, hypersecretion, nerve irritation. It seems to me theoretically unreasonable to suppose that in every such case there is necrosis even of epithelium or infection even of low grade. It is probable, however, that there is, even in the mildest cases, an exudate under pressure into the submucous and muscular coats of the appendix wall and a slight adhesive peritonitis of very moderate extent. The post-mortem findings, which show that in one person out of every three there has been some pathological condition present in the appendix, are so out of proportion to the clinical percentage of frequency, large as that is, that it seems evident that some such minor attacks *must* take place, and often with phenomena so slight that they scarcely attract attention.

The usual symptoms of such a case as we are considering, with their explanation, are: *pain*, at first general and diffused over the abdomen, because the superior mesenteric plexus of the sympathetic, which supplies the appendix, also largely supplies the intestines, and because irritative nerve pain is apt to be referred to the peripheral extremities of nerves; next and within a very short time felt in the umbilical region, because as such pain increases in intensity it is often referred to the nearest nerve centre, and the great sympathetic ganglia of the abdomen are situated in that region.

The pain at this time is often colicky in nature, and a discussion has arisen as to whether or not the circular muscular fibres in the appendix are of sufficient strength to cause it. The question will probably be settled in the affirmative, as the appendix has actually been observed in alternate spasm and relaxation when exposed in a wound (Morris); but it

seems to me unimportant, as appendix irritation may result in colicky spasm of neighboring portions of either small or large intestine.

After a few hours the pain is felt in the right iliac fossa, because it has then become a neuritis of sufficient grade to cause *tenderness on pressure*. It is a *localized* tenderness in all the varieties of appendicitis, because while the appendix itself is movable, it always arises from the same part of the cæcum, and the mobility of the latter is much more restricted. The point of pain on pressure known as McBurney's point indicates, therefore, with moderate accuracy the base, not the tip, of the appendix, and is rarely absent even in gangrenous cases, because that portion of the appendix is usually the last to be affected by interference with the blood-supply.

Vomiting commonly follows, has little relation to gastric conditions, and is ordinarily reflex and due to reversed peristalsis, as the ejecta show a degree of digestive change corresponding to the time which has elapsed since the last meal.

Moderate fever (99.5° to 101° F.) and slightly *increased pulse-rate* (90 to 110) are usually present, and are doubtless due to the same sort of absorption of intestinal products as gives rise to the same symptoms in constipation or in true bilious colic, for which cases of this kind are sometimes mistaken.

There is slight *rigidity of the right rectus muscle*, and later of the other abdominal muscles over the right iliac fossa, often, but perhaps not necessarily, due to peritonitis, and in any event arising from the fact that those muscles receive their nerve-supply from the seven lower intercostals, while the superior mesenteric plexus gets its contribution from the spinal system through the splanchnics, derived from the same seven intercostals.

This group of symptoms includes all that are of any value in this type of appendix trouble. It has been asserted (Rushmore, Osler, and others) that to speak of the first day that the patient complains of pain as the first day of the disease is fallacious, and it is said that what we recognize in appendicitis is peritonitis, which has been preceded by ulceration of the mucous membrane and a perforation of the appendix itself, and that therefore the first day of pain is rather the last day than the first day of the disease.

Now, if this were demonstrably true it would, I think, oblige us to accept the rule laid down by some surgeons, that the diagnosis of appendicitis brings with it the obligation to operate. But it is demonstrably untrue. Not only *does not* every case with the above symptoms have precedent ulceration, but there have now been enough early operations and removal of appendices at this stage to enable us to say positively that, apart from the conditions already described,—swelling, congestion, and associated vascular changes, and nerve irritation,—there are often no grave lesions of either the mucosa, the parietes of the appendix, or of its peritoneal covering.

I have dwelt upon the symptoms belonging to this class of cases because it is just here that the field of the physician and that of the surgeon is, or should be, essentially a common one. The patient naturally and properly sends for his usual medical adviser. It would, I think, be well if the latter asked for surgical help earlier and oftener than he now does. The problem with which he is confronted is as yet unsolved. While the explanation already given of the etiology and symptoms in these cases shows (1st) that they may depend upon mechanical causes, and are not necessarily infectious, and (2d) that there is no phenomenon associated with them which of itself indicates either a solution of continuity of the mucosa, infection of the appendix wall, or peritonitis, unfortunately, it must also be said that there is none which *excludes* the graver conditions. Fitz remarked eight years ago that while a simple catarrhal appendicitis exists anatomically, it is doubtful whether its clinical appreciation is possible. If he meant that its clinical differentiation from more serious conditions could not accurately be made, his remark is still true. Colicky pain, localized tenderness, slight abdominal rigidity, vomiting, moderate fever, may be the only symptoms of a case which is going on to a rapid termination by gangrene, perforation, and septic peritonitis. It must, therefore, be decided whether, taking a large number of such cases, medical treatment or operation offers the best chance for recovery; and in reaching this decision it is impossible to ignore the oft-repeated assertion already alluded to, that all cases are essentially infectious, and that recovery from any particular attack is, as a rule, only apparent and temporary, not real or permanent.

This exceedingly important matter will sooner or later be settled statistically. At present the facts seem to be as follows: perhaps eighty per cent. of cases of this type recover under medical treatment. I have looked into the published figures as to this question with great care, and have gone back in my own case-books to the days when I saw a not inconsiderable number of medical cases annually. I believe that, on

the whole, they may be taken as approximately correct. We are, however, in special need of reliable *medical* statistics as to this point. Of the remaining twenty per cent., at least one-half can be saved by operation during the condition of localized abscess, which would form in probably that proportion of cases. This assertion is based upon my own experience and upon the more extensive figures of Richardson, Fowler, and others. Of the remaining ten, in which no protective adhesions would form, a certain indeterminate proportion would recover after operation done before septic peritonitis and intestinal paresis had occurred. This would leave a death-rate of, say, five to eight per cent.

If, on the other hand, every case were operated on as soon as seen, would this death-rate be increased or diminished? Here a similar need for surgical statistics exists, but is now being rapidly met. During the period when any particular operation is fighting for recognition, and is often performed in the face of much professional opposition, the history of surgery shows that, not unnaturally, the fatal cases do not find their way into print. This period, so far as appendicitis is concerned, has now about ended, but only very recently. No careful operator to-day hesitates to give his figures and results when he feels that they have become numerous enough to be of value, but they are not yet available in sufficiently large numbers in this particular class of cases. There is probably no one present who is not familiar with some unpublished cases of post-operative deaths, and although it is doubtless true that we all know of many more cases in which death has occurred for lack of operation, that fact does not affect the truth of my statement that we do not know the mortality of such an operation under those circumstances. It has been a favorite form of expression to speak of the death-rate as "practically *nil*," and to compare it with that of cœliotomy for exploratory purposes, as in cases of tumors, etc.; but the argument by comparison is fallacious. Certain facts resting on abundant evidence, both clinical and experimental, have been ignored. We would often operate in the presence of a peritoneal infection the exact limits of which would be indeterminate. This must include not only the actual presence of micro-organisms, but the presence of their secondary products, which are now believed occasionally to give rise to so-called "chemical peritonitis." Operation, however skilfully conducted, means of necessity a certain amount of traumatism to the peritoneum and an equivalent diminution of its local resistant power. Most surgeons of experience will agree with Treves, who in his recent admirable Lettsomian Lectures says, "There is no doubt that the nervous disturbance which attends any abdominal operation leads to some degree of intestinal paralysis. This paralysis, attended as it is by vaso-motor changes in the bowel-wall, is favorable to the absorption of septic matters from the intestine." It may be slight and may disappear spontaneously; but if it persists, it appears to permit of filtration through the intestinal wall of bacteria or their products. These latter are readily taken up by the peritoneum, and a septicæmia begins. It should also be remembered that Terillon has shown that the effect of irritation of the parietal peritoneum, which is chiefly disturbed in ordinary exploratory operations, is comparatively feeble, while it is violent and intense when that covering the intestines is involved (Treves).

Therefore, while both my experience and my observation lead me to believe that, in good hands, these very early operations will have an extremely low mortality, perhaps lower than that of the disease treated medically, I do *not* believe that it will be "practically *nil*;" and, at any rate, I do not think it fair to our medical colleagues that we should take that position before we are able to demonstrate it.

As to the diagnosis of the class of cases we have just been considering, it is to be made chiefly from stercoral typhlitis, a condition which has been so overshadowed during the advance of our knowledge in regard to appendix disease that we are in danger of acting as if it were non-existent. In some elaborate reviews of the diagnosis of appendicitis it is hardly mentioned, and yet a very moderate clinical experience ought to convince any careful observer that it is not infrequent. It has many features in common with appendicitis, and it is quite possible, as has been asserted, that to some degree this is present in most cases of stercoral typhlitis, but the independent existence of the latter condition has been shown unquestionably both at autopsies and at operations, where severe forms of typhlitis and perityphlitis have been found to be dependent on stercoral ulcers of the cæcum, and the appendices were normal. It is unquestionably true that in the vast majority of cases of severe inflammation and suppuration in the right iliac fossa the appendix is at fault, but it should not be forgotten that in many of them the original trouble is a constipation, associated with distention of the cæcum by fæcal masses often

containing undigested food, and exciting both mechanical and chemical irritation. The relation of the mild attacks of appendicitis to digestive derangement has been quite unmistakable, in my experience, and it is not very uncommon to find in relapsing appendicitis that one particular article of food is the especial exciting cause of an attack. (See Case XII., page 399.)

Now, if in so many cases fæcal distention of the cæcum is the starting-point of appendicitis, it is reasonable to believe that in some of them the trouble does not pass beyond the cæcum, and it is important to recognize these cases, because the prognosis is so much more favorable and operative measures need not, as a rule, be thought of.

They have occurred with me chiefly at the times of life when appendicitis is less common, and more especially in children. They can be recognized with certainty only by the initial presence of a doughy sausage-shaped tumor in the cæcal region associated with the usual symptoms of appendicitis in a modified form. The localized tenderness is not so great; the fever is very moderate; vomiting is rarely a prominent symptom; constipation is almost invariable, though occasionally a spurious diarrhœa (analogous to the "incontinence of retention" in bladder cases) may make its appearance.

The discovery of a tumor at the very beginning of an attack of apparent appendicitis of obviously mild type, would, I think, justify the diagnosis of stercoral typhlitis, but I know no other way in which the diagnosis can be made, and in the absence of that symptom it would be safer to consider doubtful conditions as almost certainly indicating appendicitis.

Case I.*— A little girl, whom I saw in consultation with Drs. Lewis D. Harlow and Louis Starr, had an attack of vomiting followed by umbilical pain and almost immediately by right iliac tenderness. When I first saw her, about *eight hours after the beginning of the illness, a distinct mass could be felt in the cæcal region;* tenderness at the edge of the right rectus in the omphalo-spinous line was marked; she lay on her back with the knees drawn up; her temperature was 101° F., her pulse 110. Her mother stated positively that the bowels had moved regularly and that she had never known her to be constipated. Salines, which had already been given, were continued. Hot fomentations were applied to the abdomen. The diet was reduced to teaspoonful doses of peptonized milk at hourly intervals.

At the end of twenty-four hours there was a little aggravation of all the symptoms; at the end of forty-eight hours there was slight tympany; at the end of sixty hours, when we were considering the advisability of operation, there was an enormous stool, followed by two others in rapid succession and by a complete disappearance of all the symptoms.

It will be convenient now to consider the non-operative treatment of these mild "catarrhal" cases before passing on to those of the next grade.

Certain indications are so clear that there is practically no difference of opinion about them.

Ordinary clinical experience with other forms of enteritis demonstrates the value of *absolute rest* in bed and on the back. The frequent inability of the stomach to retain food, the certain inability of a portion of the intestinal tract to take care of the residue, even if it reaches that point, and the absolute need for the avoidance of all sources of local irritation point so clearly to a diet reduced to the lowest possible terms that it is always a matter of surprise and disappointment to me to find patients, even in the early and acute stages of this disorder, being fed regularly every two, three, or four hours with portions of milk and lime-water, or often with more harmful foods, as though they were in the last stage of some exhausting disease. No one, beginning in comparative health, ever starved to death in three or four days. There is no doubt that many of these patients have been fed to death. *Starvation* in its therapeutic sense is one of the most important elements of treatment, and the nearer the patient comes to taking nothing except an occasional sip of water the safer he is.

The *local* use of *heat*, drawing the blood to the superficial veins of the abdomen, of *cold*, by means of ice kept on long enough to bring about local anæmia extending to the parietal peritoneum or deeper, or the actual abstraction of blood by *leeches*, seem to have about equal claims to employment. Personally, I prefer either the heat or the bloodletting. I strongly object to blisters, iodine, and the use of smeary ointments as rendering the skin more or less unsuitable for a satisfactory operation later, if one be required.

The question about which there is the widest apparent divergence of opinion concerns the respective merits of the use of salines and the use of opium. The very briefest review of cur-

* Wherever possible I have italicized the special point or points which these cases are intended to illustrate.

rent literature will show that the writers on this subject have practically ranged themselves in two camps; often, however, expressing most decided opinions without specifying at all the class or classes of cases to which they refer. Avoiding the extremists and taking the calmest and most carefully considered articles as examples, we find Osler saying, "If there is much pain, opium should be given hypodermically or by the mouth. . . . I would protest most earnestly against the indiscriminate use of saline purges." Pepper says that "so far as medical treatment goes, the great stand-by is opium in full doses;" and adds, "that the same reasons that indicate opium should lead to the avoidance of salines." On the other hand, Treves says, "Give as little opium as possible;" and adds that he is quite convinced of the value of aperients in the early stages of appendix troubles and sometimes throughout the attack; while Fowler, after seeing one hundred and sixty cases, says that beyond the careful use of salines in the earliest stages of the mild cases the less medical treatment the better; but adds, "above all things the use of opium must be avoided as much as possible."

These four quotations will suffice to represent the opposing views.

My present opinions, which have not been reached without some thought and much hesitation, but which seem to me more and more satisfactory as my experience widens, are based on the following considerations:

I have never happened to see one of these extremely mild cases in which there was diarrhœa, nor one in which the bowels moved easily after enemata or aperients, run on into the graver type of case. I will doubtless meet with this some time, as others have done so, but thus far there has been no exception to the rule in my personal experience. I read that of twenty-two cases of peritonitis from appendix troubles occurring at the London Hospital there were nine cases of constipation, with four deaths, and thirteen cases in which the bowels were loose or were easily moved, with two deaths. I find upon analyzing Richardson's tables that of those acute cases which recovered without operation, constipation is mentioned as a prominent early symptom in four, diarrhœa in ten, while in those cases which died without operation there was early constipation in three and diarrhœa in one. The force of these figures is much increased if we remember that where neither diarrhœa nor constipation was mentioned, it is fair to presume that the bowels moved regularly. There was thus eight per cent. of constipation among the cases that recovered, and twenty-eight per cent. among those that died. In addition, every surgeon who has had any abdominal work knows how essential it is to have the intestinal tract thoroughly evacuated before operation. It is in this way and by the prompt administration of salines according to Tait's plan on the first appearance of symptoms of "pseudo-ileus" that general peritonitis is often avoided, not cured, as is incorrectly stated. As any case of appendicitis may become an operative case, it is of the highest importance that in the early stages whatever remains of peristalsis should be encouraged and not destroyed by the use of opium. Furthermore, it has been shown experimentally that after an injection of a culture of the virulent colon bacillus into the peritoneum of animals, if the dose is not too large, the animal recovers after an illness of which diarrhœa is a symptom (Treves).

For these various reasons my rule in practice is: In all ordinary mild cases give salines until free purgation is assured, and then continue the action more gently by the use of divided doses of calomel, which by its antiseptic properties has a distinct value, and through its effect on the portal circulation aids also in the depletion of the ileo-colic vein and its tributaries.

Spontaneous severe colicky pain, altogether distinct from pressure tenderness, is the only indication I recognize for the use of opium, and I give it then in minute doses combined with enough calomel to overcome its constipating tendency.

I am at present satisfied that this treatment is practically sound, and I am certainly convinced that many patients to whom opium is given early and freely die partly because the imperative need for operation is thereby disguised and the favorable opportunity lost, and partly because the free evacuation of the bowels, so necessary for success, is interfered with.

I may say here, before leaving the subject of the medicinal treatment at this early stage, that in my judgment not enough attention has been paid by either physicians or surgeons to what might be called the antiseptic treatment of appendicitis. It is reasonable to suppose on *a priori* grounds that in a disease the most serious varieties of which are produced by infection with micro-organisms whose habitat is the digestive tract, intestinal antisepsis would be of distinct value. And furthermore, I would say that in all forms of sepsis present or threatened there is good reason for believing that the systematic administration of soluble and powerful antiseptics is of far more importance than

is commonly supposed. A record which I will shortly publish of observations in this direction made on cases of carbuncle and of chronic furunculosis will, I think, be convincing of the possibility of powerfully influencing through the blood the susceptibility of the entire organism to bacterial infection and growth. But I merely mention the matter to-night to bring it to the attention of the medical men present, and to ask for their views and experience in this direction.

If the medicinal and dietetic treatment has been successful the symptoms gradually disappear, the local tenderness often being the last to go. Scrupulous continuance of rest, restricted diet, and mild laxatives should be continued for from one to two weeks.

If the symptoms are worse instead of better at the end of forty-eight hours, or earlier than that if there is *severe, sharp* pain, increased tenderness and rigidity of the abdomen, and beginning tympany, either local or general, I think there can be no doubt that surgical interference offers by far the best hopes of recovery. In the majority of cases these phenomena then indicate a perforation of the appendix wall, possibly not macroscopic, but permitting the filtration through it of bacteria and their products.

So far as diagnosis goes there is practically no condition for which such a case can be mistaken. The previous history with the symptoms above described place it beyond all peradventure. Occasionally there may be an extraordinary case in which coexistent disease of another kind would cause doubt or confusion, but I am occupied this evening not with medical or surgical curiosities, but with every-day cases, and these at this stage can scarcely be misunderstood.

We are on equally assured pathological ground. In thirteen such cases examined by Van Cott there were evidences of obstructive conditions found in the vessels of the mesentery of the appendix, either thrombus or endovasculitis, while in the appendix wall there were round-cell infiltration, necrotic areas, and purulent foci. Interstitial neuritis was also present (Fowler).

It is of course not impossible for resolution to take place in these cases. Not every one of them goes on to gangrene in mass and to infection of the general cavity. Even if resolution does not occur, a protective inflammation may wall off the appendix, and does so in a large proportion of cases.

But there is absolutely no way of recognizing with any reasonable certainty which of these three events will follow: resolution and recovery; localized abscess, with ninety to ninety-five per cent. of chances in the patient's favor; or general peritonitis, with almost sure death if it is once well established.

If operation is done at this stage it is usually easy. An incision two or three inches in length is better than a smaller one, and is most advantageously placed if it is oblique with its centre a little outside of McBurney's point. When the belly is opened there will usually be found a moderate excess of peritoneal fluid, clear or only slightly turbid and without odor, a circumscribed peritonitis, weak adhesions between the cæcum and the parietal peritoneum and adjacent intestines, and a tense, swollen appendix, either angulated and twisted or erect and prominent, according to the length of its mesentery. It can be removed most safely by making a circular incision through its peritoneal coat, three-fourths of an inch from the base, reflecting it like a cuff, ligating the mucous coat with a circular ligature, touching its surface with a drop or two of pure carbolic acid, replacing the peritoneal coat, and stitching with a Lembert suture. When the peritoneum has become thickened and brittle, almost equally good results can be obtained and more expeditiously by throwing a ligature around the whole appendix one-quarter to one-half inch from the cæcum, removing the organ, and cauterizing the stump with carbolic acid. The appendix will show the microscopic changes I have described. It would be absurd before this audience to waste time with talk of the importance of asepsis or with remarks about the details of technique.

As a rule, the wound may be closed without drainage, and, if closed properly, the risk of ventral hernia is a very small one. The operation will certainly have a small mortality, but for reasons already given it will be a larger one than if it were a simple exploratory operation.

While, however, I believe more patients would be saved by operation at this time than by any temporizing measures, I find that that opinion when expressed at the bedside is not always coincided in by the medical attendant or the patient.

I may say, therefore, that experience has taught me to await events with more equanimity: 1. If the bowels are loose. 2. If the pain is dull and throbbing (connective-tissue pain, —Bryant), and not sharp and lancinating (serous-tissue pain); the former I refer to a tense appendix, with infiltration of the wall, but without gross perforation or intense or widespread peritonitis. 3. If the spot of greatest

tenderness on pressure by a finger-tip is not precisely at McBurney's point. This is an empirical rule; but I have noticed in a number of cases in which there was delay at this stage, and which finally did well without operation, that the point of greatest tenderness so anxiously investigated at each visit was more or less remote from the usual region. If this proves to be an observation of any value, it will be for the following reasons: the body and tip of the appendix are less vascular, and less richly supplied with nerves than the base; they are, therefore, more commonly the seat of the earliest degenerative changes. If those changes are very intense, and particularly if they go on to gangrene, sensibility in the body and tip is quickly lost, and pain at the more fixed portion of the appendix, the base, becomes the prominent symptom, and is recognized at the usual point. If the changes are of a milder type, such as permits of recovery by resolution, sensibility of the tip will be retained, and will be felt at various points on the abdominal surface, varying with the position of the appendix. 4. If vomiting is not marked. It is not usually a prominent symptom of this stage of appendicitis in cases which lead to recovery. It will almost always be found present in an inverse relation to the looseness of the bowels. Its absence is a very favorable circumstance, and always, and I believe justly, influences my prognosis. 5. And, finally, I am less anxious during this period of delay if, without marked change in the general condition, increased resistance, slight dulness, and the presence of a mass recognizable by palpation indicate that a localized abscess is forming, shut off by adhesions from the general peritoneal cavity.

Case II.—A young man, whom I saw in consultation with Drs. John Musser and William Pepper, had the usual symptoms of a moderate attack of appendicitis for three days. At the end of that time the conditions present were: distinct rigidity of the abdominal muscles over the right iliac fossa; slight tympanitic distention of the same region; temperature, 101.5° F.; pulse, 110; *marked tenderness at a point just above Poupart's ligament at the junction of the middle and inner thirds.* He had been continuously on salines. His stomach was retentive, but there had been no bowel movement for two days. He was getting no food. I was strongly inclined to operate, but delay for twelve hours was decided upon, and at the end of that time there was such marked amelioration of all the symptoms that operation was not further considered.

We may pass in this condition of uncertainty into the period extending from the third to the fifth day with very little alteration of the symptoms, but usually during this time one of the three events already mentioned will occur. If the bowels continue to act spontaneously or with mild laxatives; if the tympany, which may be quite marked, begins to decrease; if the fever lessens, and especially if tenderness remains well localized and tends to subside, the prognosis is, on the whole, favorable, although the patient is unquestionably in grave danger during every minute of this time. If no amelioration of these symptoms occurs, although no new ones develop, the case at that period, from the third to the sixth day, becomes one of the most anxious and trying with which either physician or surgeon can be confronted. It is the time at which, as Richardson has tersely put it, we may feel that it is "too late for the early operation and too early for a safe late operation." It is probable that adhesions have formed, offering a certain degree of protection against general infection, but experience shows that in many cases they cannot be depended upon, and we may find at any visit that the tenderness and tympany have increased in intensity and become more widely diffused, that vomiting is more frequent and uncontrollable, that the fever has risen to 104° or 105° F., or, more ominous still, has disappeared, leaving the temperature subnormal; in other words, that the general peritoneum has become involved. If, with the fear of this occurrence before us, we proceed in such a case on the fourth or fifth day to removal of the appendix, we do so with the knowledge that there is much risk of breaking up the recent and delicate adhesions which have thus far been the patient's safeguard, and we know that it is not always possible under these circumstances, however thorough and minute our precautions, to prevent a spread of the infection. Here, again, I am not in sympathy with those surgeons who speak in an airy and confident way of the overwhelming advantages of operation, but am once more of the opinion of Richardson, whose excellent work and writings on appendix disease entitle him to frequent quotation, and who says that "there is no more difficult operation in surgery than that of removing an appendix at this stage without infecting the general peritoneal cavity." The question certainly is one of the most important connected with this discussion.

I have tried earnestly to find some light upon it, but my own experience and the recorded testimony of the profession have alike failed to

help me. With absolutely identical symptoms on which to base a prognosis at this stage, any two cases may go on, one to recovery, the other to death, and the same remark applies to the results of operation. On the whole, however, this very uncertainty tends to favor operation, in spite of its undoubted dangers.

We are now dealing with a case of circumscribed peritonitis threatening to become general. The infection which is giving rise to it is a progressive one. Ziegler and others have shown that the effect of injecting a culture of the colon bacillus into the peritoneum of animals varies, other things being equal, with the dose. In the mildest cases an illness in which, as has already been stated, diarrhœa is a symptom is followed by recovery. In another grade a localized purulent peritonitis is produced, running a slow course. If the dose is larger a fatal diffuse fibro-purulent peritonitis follows, and if still larger death may occur from acute sepsis before there has been time for any of the phenomena of peritonitis to develop. The peritoneum has thus undoubted ability to take care of certain quantities of bacterial poison, but succumbs to larger ones, and for this and other reasons it cannot be questioned that if choice had to lie between infection during and because of an operation on the third or fourth or fifth day, and, on the other hand, an operation to which we are forced on account of spontaneous infection at some later period, the former is by far to be preferred. Many recoveries do occur after operation at the beginning of a general peritonitis, but the difficulties and dangers of the case are both so greatly increased at that time that if its probable occurrence could be predicted with any certainty, operation in anticipation of it would with equal certainty be indicated.

Statistics as yet help us but little, because we do not know even approximately what proportion of patients in whom the policy of delay is adopted survive or perish.

The reported operative cases are of little use, as many of the operations were undertaken in the presence of septic peritonitis. Fowler, for example, in forty-nine operations, on the fourth, fifth, sixth, and seventh days, lost twenty-one of his patients; but eighteen of them had this condition pre-existing, and the length of time it had existed is not stated. On the other hand, I find from Richardson's figures that twenty-eight operations followed by death were done at a time averaging five and a half days after the first symptoms, while in fifty-eight operations followed by recovery the average pre-operative time was nine and one-half days.

This, however, may indicate merely what might be called the survival of the fittest, and can certainly not be used as an argument in favor of delay.

It is obvious that until we have figures, especially from our medical colleagues, which will enable us to contrast the results of expectancy with, first, the mortality of operations in the presence of distinct, but presumably localized, peritonitis and before general infection, and, next, the mortality at the beginning of general infection, we cannot settle the matter statistically.

The diagnosis between appendicitis and other distinct diseases during this period presents but few difficulties. Many of the long lists of differential diagnoses already published are useless to the practitioner of ordinary intelligence, and serve only to add to the flood of pointless compilations with which we are overwhelmed.

It is the diagnosis between the existing conditions in and about the appendix in any given case, and their probable outcome, which is of the most vital interest, and on which no amount of time would be wasted if it advanced us ever so little in our bedside knowledge of these cases at this important stage. Much weight has been attached to the presence or absence of pus, and to the great desirability of finding some reliable test for its presence. Thus far all such tests are purely theoretical, and none that have had a fair trial have given satisfactory results. It is certain that at present no safe prediction as to this point can be based on the condition of the blood or the condition of the urine. The leucocytosis described by Richardson as being present in perforation has no apparent relation to suppuration, but it requires and deserves further investigation.

But, after all, while information as to the presence or absence of pus is much to be desired, what we need far more, and what would be of far greater use to us, is information as to what symptoms indicate a persistent circumscription of the inflammatory action, whether it be suppurative or otherwise, and what symptoms point to an extension to the general peritoneum. In the presence of the latter we would operate altogether irrespective of the existence or non-existence of suppuration. Treves has shown that in the larger proportion of cases of fatal peritonitis the leading symptoms are those of poisoning, and not of inflammation. Extension of the latter to the general peritoneum means that a large part of the

enormous area of that membrane (probably as great as that represented by the whole cutaneous surface) takes part in the absorption of the products of the bacterial infection.

It should not be forgotten that the cases in which suppuration is most pronounced are among the most favorable examples of peritonitis, and that the most hopeless cases are often among those that show the least inflammatory changes. For example, seventy out of one hundred cases of peritonitis at the London Hospital died. In thirteen of these the cause of the peritonitis was either cancer or tubercle or was never found. That leaves fifty-seven examples of death from peritonitis. Now, in only fifteen of these was the exudation purulent; in eleven it was described as sero-purulent; and in the remaining thirty-one cases there was not even a suggestion of pus (Treves). It is evident that we need far more than a test for pus to aid us in these cases, and that the talk which is so common about operating as soon as there is a recognizable sign of pus, while it is correct so far as it goes, is superficial, and fails to take into account problems which are both more serious and more recondite.

I shall recur to this subject for a moment later; but as to this aspect of it, must admit that at present we have no safe rule to guide us as to the greater or lesser likelihood of generalization in any particular case of appendicitis in the stage of circumscribed peritonitis. As we know clinically that localized varieties of peritonitis and circumscribed exudations are very rare in the area occupied by the small intestine, and as we know both clinically and experimentally that the peritonitis which involves its covering is of the most violent and intense variety, it might perhaps be safe to say that where the area of tenderness is small and distinctly confined to the cæcal and pericæcal area the prognosis is more favorable than when it extends beyond that region, and the latter occurrence might thus be regarded as pointing in the direction of generalization, and, therefore, of operation; but I have no reliable observations to confirm this view, which may be unsound as a practical guide. Of the phenomena which mark the actual onset of diffused peritonitis, perhaps the gradual increase of tvmpany and tenderness and persistent vomiting are the most significant.

If operation *is* done in a doubtful case at this time, it will differ from the procedure already described in the necessity for thorough cleansing of the peritoneal cavity, if it is found to be infected, and in the employment of drainage. It differs also in the great care which must be taken, if a localized cavity containing purulent or sero-purulent fluid is found, to avoid making a communication with the general cavity of the belly. Large numbers of cases show now beyond all doubt that it is infinitely better to leave the appendix than to make a prolonged search for it, or to employ much manipulation in freeing it from adhesions preparatory to removing it. The later the time of operation and the stronger and firmer the abscess wall the safer the operative procedure becomes; but in every case and at every period, if there is a circumscribed abscess, it is poor surgery to insist upon finding and taking away the appendix in the face of obstacles.

Case III.—I saw some years ago, in consultation with Dr. Newberry, of Fort Washington, a young man with all the phenomena of appendicular abscess. An opening over the most prominent part of the fluctuating swelling gave exit to a pint or more of fetid pus. The appendix was gangrenous quite down to the base. *but was partly embedded in the inner wall of the abscess cavity. I freed it with some difficulty* and as gently as possible, ligatured it on a level with the cæcum, and strengthened the intensely inflamed area at that point with an omental flap. I drained with a glass tube. The operation was done rapidly, there was no shock, and the patient had not a bad symptom for twenty-four hours. Then he developed general septic peritonitis and died within a day or two.

This case operated on very early in the period of appendix surgery will always be a source of regret to me. I did what was then considered the ideal operation in the face of great difficulties, but lost the patient. From that day to this I have never lost a case in which there was at the time I operated a well-localized abscess. I have often removed the appendix when it was easily found, but I have oftener left it without more of a search for it than could be made in two or three minutes.

Case IV.—Later, I saw, in consultation with Professor William Osler, of Johns Hopkins, and Dr. Kerr, of Washington, a lady who was suffering with an attack of appendicitis of a chronic type. She had been ill for more than two weeks. There was a thick-walled tumor in the right iliac fossa. An incision through thickened and œdematous tissues gave vent to a large quantity of fetid pus. Digital exploration with the finger showed dense adhesions in every direction. *No further search for the appendix was made.* A drainage-tube and iodoform gauze were inserted and the angles of the

wound closed. Recovery was uninterrupted. A sinus which persisted for a time finally healed.

CASE V.—I operated, in consultation with Drs. Mackenzie and Sheppard, of Trenton, on Mr. P., a brewer, exceedingly stout and in an apparently profoundly septic condition. The abscess cavity which I opened was so immense that it seemed almost certain that it was practically the general cavity of the peritoneum. No free coils of intestine could be felt, however, even with the whole hand introduced and swept cautiously around the walls of the cavity, which reached over beyond the middle line. A loose fæcal concretion was found. No search was made for the appendix. Irrigation, iodoform, glass drainage, and iodoform packing were used. An unfavorable prognosis was given, but the patient made a rapid and uneventful recovery.

I could record many such cases, but there is not enough variety about them to make their details of interest. They have recovered without exception.

The soundness of this procedure is abundantly certified to. In a series of cases of perforative peritonitis reported by Kaiser, of six examples in which the exact point of perforation was never found, five recovered. Treves says, "The wisdom of doing no more than is necessary, or as little as is obvious, is well illustrated in these cases. A clump of adherent intestines will often cover and protect a perforation, and the ubiquitous lymph will many times close such an opening with more speed and security than are provided by any system of suturing. As the surgeon, therefore, reaches what appears to be the starting-point of the peritonitis, he must proceed with the utmost caution, and be not only prepared, but rather inclined to leave the actual *fons et origo mali* undemonstrated. The main purpose of the operation is to allow a noxious exudation to escape and, if possible, to free the peritoneum of the cause of its trouble. In the class of cases now under discussion, a perforation will be very often the starting-point of the peritonitis; the lapse of time and the plastic character of the inflammation afford evidence that the perforation is for the time being closed. If the operator can rid the serous cavity of the effects of the perforation, he may very often leave the breach itself to be dealt with by natural means." In seventeen cases in which Fowler did not remove the appendix, and which recovered, there was recurrence in only two within the next two years. The remainder had gone for variable periods, three of them for between three and four years, without any symptoms. I have now had fifteen such cases myself, and in none of them have I heard of any subsequent trouble other than the occasional occurrence of a small fæcal fistula, which sometimes relapsed once or twice, but has thus far finally closed spontaneously and permanently in every instance.

Usually at the operation the cæcum is the first structure recognizable after the abdominal wall is incised, and the anterior muscular band leading to the base of the appendix is occasionally a useful guide; but generally the increased resistance felt by the finger at a particular point, followed by inspection with the wound gently held open by retractors, will reveal the whereabouts of the organ. If it is found in this way and can easily be isolated by the finger and a thread thrown around its base, its removal is clearly indicated. If, however, as in a case operated on a few days ago, it is deeply embedded in the abscess wall and its tip only is visible, it is far better to leave it undisturbed.

CASE VI.—The patient was referred to me at the German Hospital by Professor James C. Wilson. She was a woman of fifty years of age, but had not had her menopause. She was of low intelligence, and no satisfactory history could be obtained. It was certain, however, that after her admission to the hospital she complained bitterly of pain in the left iliac region, and only later of pain and tenderness on the right side. Vaginal examination revealed a firm, resistant, tender mass on the left side and nothing abnormal on the right side. Her temperature was 101° to 103° F.; her pulse 110. There was dulness over the right flank. There was general tympany; some general tenderness, more marked, however, on the right side and at McBurney's point. Borborygmi could be heard by abdominal auscultation. The bowels moved freely under salines, after which there was a drop of two degrees in temperature and some improvement as to her feelings, but the local phenomena remained unchanged. An incision gave exit to perhaps twenty-four ounces of horribly fetid pus, which had been under great pressure. Inspection showed the distal extremity of the appendix projecting into the cavity *from among a mass of intestinal coils covered with lymph and firmly matted together. No effort was made to remove it.* The patient has done well.

The same reasons that forbid interference under these circumstances have prevented me from looking long or earnestly for other foci of

suppuration. Sometimes they may easily be recognized and opened into the larger abscess cavity by the finger; but when this is not the case, I think the patient's chances are better if the possibility of their presence is disregarded, as they are found in only a minority of cases, and as then they not infrequently open spontaneously into the original cavity.

Irrigation, drying the cavity, dusting it with iodoform, the insertion of a large, thick-walled, rubber drainage-tube, and light packing with iodoform gauze complete the operation, as I am in the habit of performing it.

The prognosis during all this period is in direct relation to the localization of the symptoms and to the absence of general sepsis. Nothing else is of much importance. Accordingly, a well-marked tumor, a moderate fever, a high-tension pulse not of excessive frequency, a limitation of the tenderness to the right iliac region, even if there it be exquisite, any evidence of continued peristalsis, such as the recognition of borborygmi by abdominal auscultation, are all favorable.

But at this or at any stage of this disease, from the earliest onset to the period of complete recovery, we may meet with quite a different set of symptoms. In the beginning the torsion of the appendix may be nearly or quite complete; or with moderate torsion there may be an exceptionally imperfect blood-supply; or in either case the bacteria present may be of especial virulence or in unusual quantity; or, finally, the resistant power of the individual may be markedly defective. According to the varying predominance of one or the other of these factors, we meet clinically with types of cases directly comparable with those conditions produced in animals by experimental inoculation with the colon bacillus. Two of these we have now very imperfectly considered,—the mild cases in which the peritonitis is an inconsiderable element and which usually end in recovery, and the cases of distinct circumscribed peritonitis running a more chronic course and ending either in resolution or, if more severe, in localized suppuration. Either with or without these precedent stages we may have a general septic peritonitis. If this results from spread by continuity,—the usual mode in which a localized peritonitis becomes general,—or by infection through the lymphatics of the appendix and meso-appendix, or by a slow leakage of inflammatory products through the appendix wall, or by the migration of bacteria along the same channels, its approach may be slow; if it follow the rupture of an abscess it will be much more rapid.

Case VII.—In a case recently seen, in consultation with Dr. Joseph Martin and Dr. Thomas Yarrow, the patient had been in excellent general condition up to noon of the fourth day of his illness; temperature, 101° F. to 102° F.; pulse, 90 to 105; moderate vomiting, obstinate constipation. When Dr. Yarrow first saw him, *six hours later, the temperature had dropped to normal, the pulse was 120 and thready.* There was great restlessness; constant rejection of small mouthfuls of fluid; a distended board-like belly. When I saw him, within a few hours, the pulse was 140 and running; the temperature normal; consciousness perfect; restlessness incessant. No operation was advised. He died in a short time.

Case VIII.—I saw, in consultation with Drs. Johnson, of Lawrenceville, and Elmer, of Trenton, Mr. B., a teacher in the Lawrenceville School, New Jersey. He had been apparently convalescing from an attack of appendicitis when, contrary to orders, he walked from one room to another. *He was at once seized with a violent abdominal pain, which was immediately followed by distention, vomiting, and symptoms of shock.* I operated a few hours later, irrigating and draining the purulent cavity, which contained a large quantity of pus, but he died the next day.

Case IX.—An almost precisely similar case, seen at Princeton by Dr. Agnew and me, in consultation with Dr. Bergen, had a similar course and termination. In this case also operation was tried as a last resort.

But in either event it is usually of the fibro-purulent variety, and is accompanied by much exudation. The patient soon presents the typical picture of diffused peritonitis: incessant restlessness, greatly-distended belly, tender everywhere to the lightest touch, dorsal decubitus, constant vomiting of small mouthfuls without much effort, thoracic respiration, obstinate constipation, absence of intestinal sounds, high fever, followed towards the end by subnormal temperature, cold sweats, and collapse.

It is of great interest, however, to note that even the cases which tend to run this course will occasionally recover when seen and operated on at the very onset of the generalized symptoms. In fact, if operation *precede* the development of septic paralysis of the intestines, a very fair percentage of such cases will recover; but after the latter phenomenon has appeared I regard the case as absolutely hopeless. If it is unmistakably present, it is, I

think, best to decline to operate, as we will have less difficulty in obtaining consent to operative interference where we can do more good, if there are fewer deaths, which, however unjustly, seem to the laity to be, so far as operation is concerned, in the relation of effect to cause.

But if there is any doubt about it, it is well to open, irrigate, and drain the abdomen. I have already called attention to the fact that the suppurative cases are among the most favorable examples of peritonitis, whether general or localized. When localized they are *very* favorable, and even in these general septic cases the more the suppurative process overshadows the toxæmia the better the patient's chances. It may be well to note a possible explanation of this fact. Reichel some years ago determined that by gradually administering increasing doses of pure cultures of pyogenic micrococci to the peritoneum of an animal an immunity against an extremely large dose of this poison could be produced.

The same immunity was acquired in the same way against the introduction of a sterile filtrate from the cultures and against the metabolic products of the staphylococci. Control experiments were uniformly fatal in animals not previously prepared.

Attention has been called by Binnie to the clinical differences between the rupture of a chronic pyosalpinx, even if of enormous size, and a case of very acute or so-called fulminating appendicitis with gangrene of even a small portion and escape of the contents.

Case X.—I saw some time ago, in consultation with Dr. William Pepper, a child in whom, within a very few hours of the onset of the symptoms, there *was gangrene, not only of the appendix itself, but also, and apparently as a result of an overwhelming bacterial infection, of an adjacent portion of the ileum.* Distention was enormous. An enterostomy was done with a little temporary relief, but the child died soon afterwards.

The chances of the patient, if operated on in a reasonable time, are far better in the former than in the latter case. Operation within three hours of the very first symptoms of such an event has failed to save the patient. He dies, as Treves has emphasized, not of the inflammation, or still less on account of any suppurative process, but from a profound toxæmia. In the pyosalpinx there has been an opportunity for slow auto-inoculation; in the rapid gangrene of appendicitis there has been no time for this process. It is in such cases that we often find the flat, silent belly indicative of absolute paralysis of the *whole* intestinal tract, no peristalsis remaining in any portion to force gas into any other portion; and we have all the symptoms of shock and collapse. Here also operation is useless and to be avoided.

But in the suppurative cases, for both the practical and theoretical reasons above given, if any sign of peristalsis remain—and this is the very best indication I know of as to interference or non-interference in these excessively grave cases—it is better to open and irrigate, even if the patient is liable to die on the table. Occasionally a desperate and apparently hopeless case will be saved.

Possibly the protective effects of auto-inoculation may help to explain the comparatively favorable results obtained in some of the later operations, though it would be pushing the idea beyond reason to base upon it any defence of delay. Yet I am sure that every surgeon present must have occasionally felt surprised when, in operating on these slow or so-called chronic cases of appendicitis, he has contrasted the relative mildness of the symptoms with the enormous quantities of fetid pus under high pressure which he sometimes evacuates.

Case XI.—I saw recently, in consultation, a case in which *there were practically no general symptoms* beyond a temperature of 100° F., a furred tongue, and some malaise. The patient had been out of bed within a day or two. The physician in attendance declined to believe in the presence of pus, which seemed to me indicated by the local symptoms. He assented, however, to an operation, which showed the presence of *twelve ounces of markedly fetid pus*, the first gush of which came with such force that it was projected a foot or more from the patient.

The best immediate indication of gross perforation of the appendix, with escape of its contents into the general cavity, is sudden violent excessively acute pain, followed by rapid change of temperature, either rise or fall, and marked increase of pulse-rate with diminution of volume and force. If the sepsis be profound the belly may be flat; if a little less in degree it may be barrel-shaped. Vomiting is usually a conspicuous symptom of this, as it is of other forms of perforative peritonitis, except that resulting from perforation of the stomach. It often shows its usual inverse relation to normal peristalsis. In eight cases of perforative peritonitis in which the bowels moved freely up to the time of the accident, constipation immediately followed in five. In these the vomiting

was much more marked and persistent than in the remaining three where the bowels continued loose (Treves).

Of course in these cases operation must be immediate, and even then the mortality has been, and doubtless will be for many years, enormous.

Recurrent and Chronic Relapsing Appendicitis.—There remains to consider briefly the subject of recurrent and of chronic relapsing appendicitis. Here again the most diverse views exist, and we are brought back to our original starting-point as a basis for discussion. If, as I believe, various mechanical factors enter into the production of acute attacks, and if quite commonly those factors are brought into play by digestive derangement, and if an acute attack does not of necessity leave a permanent lesion of an infectious type, it is obvious that a patient may have two or even more mild attacks and safely decline operation. If, however, after any and every inflammation of the appendix, the patient is left, as has been asserted, with what is practically a charge of dynamite in the abdomen, operation should be much more frequent than it has yet become.

We shall do well, both in discussion and in practice, to separate the recurrent from the chronic relapsing cases. The former are well illustrated by the following case.

CASE XII.—In December, 1889, a gentleman aged thirty-eight had a mild attack of catarrhal appendicitis. He was ill for two or three days; was out of bed in four days. He was treated by rest, starvation, salines, and calomel. *His attack followed immediately upon a too hearty meal of broiled lobster after a day's shooting.* In 1890 he was in New York and on a visit, and had another attack. I was telegraphed for and went over to see him, meeting in consultation a well-known surgeon who had been called in at once. We agreed as to the undesirability of an operation at that time, but later disagreed, the New York surgeon advising removal of the appendix as soon as convalescence was established and I dissenting. I based my advice on the fact that the second attack, like the first, was clearly due to overeating when tired, and especially on the circumstance that *it again followed a meal of broiled lobster.* Moreover, neither attack had been of a dangerous type. The opposing views were submitted by the patient, at my suggestion, to Dr. Agnew, who decided in favor of delay, and subsequently to Mr. Treves in London, who coincided in that opinion. The patient has never had another attack.

I have seen many such cases, and I am sure that this will be the testimony of the medical men who are most capable of informing us on this branch of the subject. At present I feel quite clear that the outcry for operation after one or two *such* attacks is based on conceptions of the etiology and pathology of the disease which are so incorrect that they entirely vitiate the arguments founded upon them.

In chronic relapsing appendicitis the case is somewhat different. The interval then is not one of entire health; there are digestive disorders, flatulence, constipation or diarrhœa, and pain in the right iliac fossa, aggravated by motion, or exercise, or fatigue. The attacks themselves are of a higher grade of severity, are accompanied by the appearance of a tumor, which often never entirely disappears, and by distinct evidence of localized peritonitis. The general health suffers severely, and the patient is apt to be anæmic and emaciated. I have observed this especially in females.

CASE XIII.—In a case sent me from Bellefonte, Pa., by Dr. Seibert, the child, a little girl aged ten years, was reduced to a condition of such *chronic invalidism and exhaustion* that even during an interval it was a question whether she could survive the journey to Philadelphia; and yet the operation was of the easiest type, completed in ten minutes without trouble. The appendix was thickened and twisted and diseased, but had no important adhesions. *The improvement in health was immediate* and has been continuous.

In the majority of these cases which finally require operation, especially in those in which the persistence of the local symptoms during the interval is marked, pus is present in small quantity and surrounded by thick, firm adhesions.

CASE XIV.—On the other hand, as in the acute cases, very great local disease may be attended with almost no constitutional phenomena. In a patient of Dr. Fussell's I found a *degree of inflammatory thickening and of fusing together of cæcum, appendix, omentum, small intestine, and parietal peritoneum that nearly made the operation impossible* and excited in my mind grave fears for the ultimate result, *and yet the boy had been walking and playing and complaining of local pain only occasionally, and he made a rapid and uninterrupted recovery.*

CASE XV.—In a patient of Dr. Russell Johnson's, on whom Dr. Agnew and I operated,

there had been so *large a number of attacks, brought on by exertion*, that the young man was almost afraid to stir out of the house, and yet he was a *picture of health and was not in the least affected in spirits or otherwise*. The local pain was simply so severe that while it lasted it was crippling. The appendix was adherent to the brim of the pelvis.

CASE XVI.—A *healthy, robust* woman, sent to me by Dr. Snyder, of White Haven, had had between *one hundred and two hundred attacks*. The appendix was angulated and buried in a mass of omental adhesions.

The diagnosis may usually be made by the history, the localized pain, the variable tumor, etc. Not infrequently, especially where the early stage of a malignant neoplasm is suspected, the only possible diagnosis is by exploratory incision.

Even these cases do not invariably require operation. In some instances I have suggested it, and then have acquiesced in the patient's request for a period of delay, which has now in several cases extended over some years and seems likely to be permanent. Treves, who originally proposed the operation in 1877, has thought it necessary within a year to call attention to the fact that it has been performed recently without proper discrimination, and adds, "The circumstances which would justify an operation in these cases must be precisely defined, and it cannot be too emphatically stated that, in a fair proportion of instances in which the trouble has relapsed, no surgical interference is called for. "I am aware of many cases in which a patient has had three or more attacks of typhlitis, and has then ceased to be troubled with any further outbreaks. In some examples of the relapsing form much can be done by medical means, by diet, by attention to the bowels, and by placing the patient under conditions more favorable to a state of peace within the abdomen."

Here again, also, we have the old fable about the mortality of the operation being "practically *nil*," but Bull's statistics, just published, show a mortality of nearly two per cent., and he remarks that if he could add four fatal cases that he is aware of, it would be raised to more than two per cent., and, further, that five or six per cent. would be a fairer estimate if we struck an average of the work of individual surgeons. There is, however, good reason for believing that the mortality for the operation in skilful hands will be a low one. The experiments of Reichel, already alluded to, demonstrate beyond a doubt the possibility of a certain immunity resulting from auto-inoculation with pyogenic material. There seems to be good reason for believing that this comparative invulnerability thus acquired renders the peritoneum more indifferent to traumatism than in its normal condition. (See Case XIV.) It is a clinical fact that an intraperitoneal operation on a subject who has had several attacks of subacute or chronic peritonitis is, *cæteris paribus*, a less serious affair than if the same operation is done on a patient whose peritoneum has hitherto been uninvaded by disease or for operative purposes. Treves says as to this point, "In the operation for the removal of the vermiform appendix in cases of relapsing typhlitis, the little disturbance which follows extensive procedures occupying as long as one hour and a half can, I think, be explained only by an immunity acquired by the peritoneum after repeated attacks of inflammation. Moreover, in advanced cases the disproportion which is often noted between the constitutional disturbance and the local condition discovered at the operation appears to be capable only of the same explanation."

CASE XVII.—In another relapsing case just operated on for Dr. Fussell the appendix was buried in dense adhesions posterior to the cæcum, and was firmly adherent by its tip to the iliac vein. The union was so intimate that I tied off both tip and base and removed the intermediate portion, which showed a small perforation. There was present a general plastic peritonitis. The patient, who had only recently recovered from a severe attack, *was extremely emaciated and had the typical facies abdominalis*, and yet *six hours after the operation*, which took three-quarters of an hour, *his temperature was normal, his pulse 102, he had a movement of the bowels, and expressed himself as feeling better*. He is now making an excellent recovery.

If the indications for operation are clear, I think the question as to whether it shall be done between or during attacks must be unhesitatingly decided in favor of the period of quiescence, the operative difficulties being then much less, especially as regards the important question of possible general infection. In the recurrent type, if operation is to be considered at all, it would be well to take the inappreciable risk of waiting for another attack, which may never come.

In the chronic relapsing cases, however, if the surgeon, in deciding upon operation, limits himself to the following indications formulated

by Treves, which fairly express those of many surgeons in this country, myself included, he had far better take advantage of the interval. Operation is indicated when: 1. The attacks have been very numerous. 2. The attacks are increasing in frequency and severity. 3. The last attack has been so severe as to place the patient's life in considerable danger. 4. The constant relapses have reduced the patient to the condition of a chronic invalid and have rendered him unfit to follow any occupation. 5. Owing to the persistence of certain local symptoms during the quiescent period there is a probability that a collection of pus exists in or about the appendix.

The operation itself may be one of the easiest in abdominal surgery, or so difficult as to be impossible in its entirety, if due regard is had to the survival of the patient. (See Case XIV.)

There are no very radical differences of opinion as to its technique, so the details need not be mentioned. Such differences as do exist relate chiefly to the symptoms and conditions which demand or which justify the operation. Bull has well expressed the situation in this respect: "We need more carefully recorded cases not only of the patients who come to operation, but of those who have successive attacks relieved by medical measures. There are many gaps to be filled between the position of the surgeon who operates only when there are definite symptoms of chronic disease which have been found by operation to correspond with definite lesions of the appendix, and those who resort to operation after one or two attacks in individuals who have no symptoms, because they believe future attacks must occur in the order of nature and must endanger life. The position of the former may be too conservative, but I think it is 'up to date' with the knowledge we have at present. The attitude of the latter is unscientific, as their statements are not borne out by demonstration."

It is just to say, in conclusion, that, while I see no reason for joining in the outcry about the claims of appendicitis to be considered a purely surgical disease, the sum total of the relations of surgery to appendix troubles reflects the greatest credit upon that branch of the profession both in this country and abroad. The beneficent work done by surgeons has now fully established their right to be early participants in the management of cases to the later and more unfavorable stages of which they are so frequently called. Altogether apart from the extravagant claims of extremists, it is certain that the field of operative surgery in this disease is a steadily widening one, and that as time goes on and the joint labors of progressive yet duly conservative men in both medicine and surgery begin to bear their fruit, we shall save, by increasing precision and exactness in diagnosis and treatment, many lives now unavoidably sacrificed.

The views above expressed may be summarized as follows:

1. The explanation of the great frequency of inflammation of the appendix is to be found in the following facts:

(*a*) It is a functionless structure of low vitality, removed from the direct fæcal current; it has a scanty mesentery so attached to both cæcum and ileum that it is easily stretched or twisted when they become distended; it derives its blood-supply through a single vessel, the calibre of which is seriously interfered with or altogether occluded by anything which produces dragging upon the mesentery.

(*b*) In addition, there is almost always present a micro-organism—the *bacterium coli commune*—capable of great virulence when there is constriction of the appendix or lesions of its mucous coat or of its parietes.

2. The symptoms in a case of mild catarrhal appendicitis—general abdominal pain, umbilical pain, localized pain and tenderness on pressure in the right iliac fossa, vomiting, moderate fever, and slightly-increased pulse-rate—cannot at present with any certainty be distinguished from the symptoms, apparently precisely identical, which mark the onset of a case destined to be of the very gravest type.

3. It must be determined by future experience whether or not operation in every case of appendicitis, as soon as the diagnosis is made, would be attended by a lower mortality than would waiting for more definite symptoms indicating unmistakably the need of operative interference. At present such indication exists in every case if the onset is sudden and the symptoms markedly severe, and whenever in a mild case the symptoms are unrelieved at the end of forty-eight hours, or, *a fortiori*, if at that time they are growing worse.

4. It must be determined by future experience whether cases seen from the third to the sixth day, which present indications of the beginning circumscription of the disease by adhesions and which tend to the formation of localized abscesses, will do better with immediate operation with the risk of infecting the general peritoneal cavity, or with later operation when the circumscribing wall is stronger and less likely to be broken through. At present, operation is certainly indicated whenever a firm, slowly-forming, well-defined mass in the

right iliac fossa is to be felt; or, on the other hand, when a sudden increase in the sharpness and the diffusion of the pain and tenderness points to perforation of the appendix or breaking down of the limiting adhesions.

5. In the beginning of general suppurative peritonitis, operation offers some hope of success. In the presence of general peritonitis with septic paresis of the intestines, operation has thus far been useless.

6. Recurrent appendicitis of mild type, like acute appendicitis, frequently results from digestive derangements. Several attacks may occur followed by entire and permanent recovery, but it is as yet impossible to differentiate these cases accurately from those which do not tend to spontaneous cure. Operation is certainly indicated whenever the attacks are very frequent.

7. Chronic relapsing appendicitis is characterized by the persistence of local symptoms during the intervals and by more or less failure of the general health. It usually indicates operation.

8. In either the recurrent or the chronic relapsing variety operation should be advised according to the following indications formulated by Treves: whenever (1) the attacks have been very numerous. (2) The attacks are increasing in frequency and severity. (3) The last attack has been so severe as to place the patient's life in considerable danger. (4) The constant relapses have reduced the patient to the condition of a chronic invalid, and have rendered him unfit to follow any occupation. (5) Owing to the persistence of certain local symptoms during the quiescent period, there is a probability that a collection of pus exists in or about the appendix.

TREATMENT OF ALCOHOLISM BY STRYCHNINE NITRATE.

BREED concludes a paper in the *Medical News* of April 7, 1894, on this subject as follows:

1. That we have in this drug a remedy that actually, for a period as yet undetermined, removes the desire for alcoholic stimulation in the chronic inebriate, and that *without the least effort on his part.*

2. A remedy that removes the distress and gnawing at the epigastrium, so common upon the withdrawal of alcohol.

3. A remedy that tones up the nervous system, allays the insomnia, the flighty and other bad feelings in the head, the mental disturbances, and the tremulous agitation and uncertainty of voluntary motions due to the withdrawal of stimulants.

4. A remedy that brings back the appetite and general physical vigor of the body.

5. A remedy that temporarily transforms a wholly demoralized creature into a man.

6. A remedy that is of great value in acute attacks of alcoholism.

7. Incidentally, a remedy that is an exceedingly good and safe heart-tonic.

8. More than all, a remedy that exerts a moral influence upon the patient, giving him what he had before wholly lost,—to wit, hope, enthusiasm, self-confidence, and courage, where before was despondency, abandonment, and despair; a steady, straightforward gaze, and a bright, youthful expression of the eye, which replaces the shamefaced, sneaking, apologetic air of total depravity of the chronic inebriate.

9. We have in the nitrate of strychnine not a remedy that will oblige a man to abstain from drink if he does not want to do so, and such subjects do not deserve one. From the results obtained by the gold cure, the silver-ash cure, the Keeley cure, etc., we may conclude that we have a remedy that is as efficient as any of these and much safer; a remedy, moreover, that is not secret, and can be used by men who know the action of drugs and can use them with discretion and safety to the patient.

THE EFFECTS OF QUININE ON PREGNANCY.

A collective investigation of this subject is published in the *Indian Medico-Chirurgical Review* for February, 1894, the results of which are as follows:

1. The existence of pregnancy is no bar to the administration of quinine.

2. For fevers and other affections during pregnancy in which quinine is indicated the effects of the drug are more marked than those of any other.

3. That abortion following the administration of quinine is either the result of the original malady or the effect of idiosyncrasy.

4. That allowing for an idiosyncrasy, in cases in which a tendency to abortion exists, and in others as a matter of precaution, quinine is best administered combined with a sedative (opium).

5. Hence the old-standing view of the action of quinine on the duration of pregnancy is not borne out by the clinical experience collected in the replies.

The Therapeutic Gazette

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GENERAL THERAPEUTICS.
With special departments under the charge of
G. E. DE SCHWEINITZ, M.D.,
OPHTHALMIC AND AURAL THERAPEUTICS,
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SURGICAL AND GENITO-URINARY THERAPEUTICS.

GEO. S. DAVIS,
Medical Publisher, Box 470,
DETROIT, MICH.
Philadelphia, 714 Filbert Street.

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Leading Articles.

THE VALUE OF BOILED MILK AS AN ARTICLE OF DIET.

EVERY practitioner of medicine knows that in the treatment of certain cases of diarrhœa, where an absolute milk diet is required, better results follow the use of boiled milk than of raw milk, and for this reason it has become a popular idea among the laity and members of the profession that cooked milk is the more digestible. However this may be in clinical experience, it is certain that experimental research does not justify this conclusion. Ten years ago the late Dr. Randolph, of Philadelphia, made an interesting series of experiments to determine this point. A number of men in perfect health were given raw milk to drink; an equal number, equally healthy, were given a similar quantity of boiled milk. An equal time after the ingestion of the liquid a hypodermic injection of apomorphine was administered to each, and a careful examination made of the vomited matters to determine how far the process of digestion had proceeded. In every instance it was found that the raw milk was more digested than the cooked, and as Randolph graphically expressed it, "We obtained proof that in making milk, nature made that compound most easy of digestion."

The experiments of Crolas, on the other hand, seem to point to a different result, for he believes as a result of his studies that boiling has no action whatever on the casein or lactose, and removes from the liquid a small quantity of butter, which is entangled with the film of albumin which forms on the surface of the milk. He also thinks that boiling increases the quantity of the free soluble phosphates, and concludes, in opposition to the studies of Randolph, that boiled milk is equivalent, if not superior, to raw milk.

The correct solution of the problem probably lies in the class of cases to which the milk is administered. There is no doubt whatever that raw milk is more digestible than boiled to the healthy individual, and it is an undeniable fact that boiled milk is far more constipating, and that an attempt to place a patient upon a diet of boiled milk would more certainly tend to disorder digestion and assimilation than a similar attempt with the raw article. In Bright's disease, diabetes, and similar conditions in which a milk diet is desirable, we may therefore conclude that raw milk is the liquid to be employed, whereas, in cases of diarrhœa, the boiled milk is by far the best preparation. We have already pointed out in earlier leading articles that both raw and boiled milk have their digestibility very much increased by being somewhat diluted with any sparkling water, or by the addition of a sufficient quantity of salt to give a distinct flavor.

THE TRUE VALUE OF METHYLENE-BLUE IN MALARIAL FEVER.

THE readers of the THERAPEUTIC GAZETTE who have carefully read the articles upon methylene-blue in the Progress columns during the last year must have obtained views very much in accord with our own concerning the value of this new medicament in paludal disease. It has now been tried in a sufficient number of cases of all kinds and all ages to give us sufficient ground to reach fairly positive conclusions as to its value. The studies of Ferreira upon the action of the drug in chil-

dren, those of Thayer in Baltimore, and of a number of other investigators in Europe and America seem to prove very positively that the drug is of value in all cases of malarial disease, although it does not possess the powerful antiperiodic properties of quinine. Its therapeutic indications, therefore, point to its employment in those persons who have an idiosyncrasy to quinine, or in those in whom quinine has failed to produce as beneficial results as is desired. The best way to administer it is in capsule or solution, in the dose of 2 to 3 grains twice or thrice a day, attempting to administer the fullest doses in cases of intermittent fever about two or three hours before the time at which the malarial attack is expected. It should be remembered that in some persons methylene-blue produces disagreeable symptoms, which generally consist chiefly in signs of irritability of the bladder. If these symptoms are excessive, it is possible that the methylene-blue is contaminated by arsenic. An important point in regard to its successful use in malaria is the fact that it must be continued for some time after all malarial manifestations have disappeared; indeed, after careful blood examination fails to show any signs of the malarial organism. A disadvantage in its use is the fact that relapses seem to occur with greater frequency in those who are supposed to be cured than in similar cases which have experienced relief from full doses of quinine.

INTESTINAL INDIGESTION WITH FERMENTATION.

IN an earlier number of the THERAPEUTIC GAZETTE we wrote a leading article upon the employment of creosote in the treatment of gastric indigestion associated with fermentation. There is another class of patients who suffer equally severely, not so much from gastric disorder as from the accumulation of large amounts of flatus in the small and large intestine, as the result partly of constipation and partly of atony of the duodenum in its digestive function. Frequently these patients suffer severely from pain in the region of the præcordium, which is so severe as to bring them to the doctor's office with the fear that they are suffering from cardiac disease. As a general rule no cardiac lesion will be discovered, but in its place there will be found evidences of dilatation of the transverse colon and a general tympanitic condition of the entire belly, with a particularly high pitched tympanitic note near the præcordium about the point where the transverse turns to become the descending colon. It is at this point that the gas which is produced becomes lodged and reflexly causes not only pain, but marked cardiac palpitation. In other instances the pain is felt at other portions of the alimentary canal, and in nearly every instance the resulting discomfort is sufficient to make the patient very grateful for relief. In a certain proportion of cases this symptom disappears under the administration of a prescription, as follows:

℞ Salol, ʒi;
Pancreatin, gr. xl;
Oleoresin capsici, ♏xx.
M. Ft. in pill No. xx.

If this is prepared by a careful druggist the patient will have no difficulty in swallowing the pill because of its size.

THE DOSE OF GRAY OIL AND BICHLORIDE OF MERCURY HYPODERMICALLY IN SYPHILIS. A CORRECTION.

THROUGH an error, the dose of gray oil was given as 10 to 20 minims in the editorial entitled "The Treatment of Syphilis by Hypodermic Injections," on p. 327 of the issue of May 15, 1894. The amount should have been 1 to 2 minims. The dose of bichloride of mercury recommended—namely, $\frac{1}{10}$ grain—may be rapidly increased, if the patient stands the drug, to $\frac{1}{8}$ or $\frac{1}{4}$ grain, but $\frac{1}{10}$ grain is not too small for a beginning dose.

TREATMENT OF HYPERTROPHIED PROSTATE BY CASTRATION.

IN the November, 1893, number of the THERAPEUTIC GAZETTE there appeared an editorial calling attention to the surgical treatment proposed by J. William White for the relief of the bladder symptoms dependent upon hypertrophy of the prostate. White, basing his conclusions upon a series of observations upon animals and on the post-mortem findings in the case of eunuchs, came to the conclusion that the prostate was a sexual organ dependent for its development on the presence of the testicles, and that by removal of the latter this gland could be made to atrophy. His laboratory experiments, conducted by Kirby, having proved the truth of these propositions, he further argued that an hypertrophied prostate would probably undergo similar atrophy in case the testicle is removed, this thought no doubt being

suggested by the effect of removal of the ovaries upon fibroid tumors of the uterus.

Griffith arrived at conclusions practically identical with those of White, excepting that he did not propose removal of the testicles as a means of curing prostatic hypertrophy. Since the publication of the leading article above referred to this proposition of White's has been practically carried out by himself and others with most gratifying results.

Ramm (*Centralblatt f. Chirurgie*) reports two cases of prostatic enlargement cured by double castration. The first case was kept constantly under observation after operation until the last of December, 1893. The prostate, which before operation was the size of a medium-sized orange, was shrunk into an almost flat mass. The patient during the day passed his water as well as ever, and was required to rise three times only during the night.

The second patient, sixty-seven and a half years old, was operated on in April, 1893. He first reported to the hospital in 1887 for the relief of urinary retention, and gave a history then of having suffered for fourteen years with difficulty in passing his water. After being relieved at this time he continued to suffer from attacks of retention, and had to use a catheter at intervals, sometimes repeatedly during a single hour. In 1892 suprapubic puncture was made. At this time the patient was suffering from cystitis, the bladder was distended until it reached to the umbilicus, the prostate was huge, and catheterization most difficult; the urine was extremely offensive. On the night following castration the patient passed his water without the use of an instrument. In two weeks the prostate was markedly lessened in size. The third week the bladder was completely evacuated by voluntary effort, the patient urinating five to seven times during the day. Six weeks later, in the erect posture, he could urinate without trouble, projecting a stream outward for a distance of twenty inches. At the time of reporting the prostate as atrophied the patient was never compelled to use a catheter, he urinates four or five times a day, once at night, has no symptoms of cystitis, and is practically able-bodied.

Ramm concludes as a result of his studies that the prostate is a sexual organ, is an organ which develops at puberty, and that malformations and early castration cause it to remain undeveloped, and even after it has attained its full growth castration will cause it to atrophy; that hypertrophied prostate will also atrophy after castration, this lessening in volume beginning almost immediately and continuing until the enlargements entirely disappear; and, finally, that the fact that castration may cause atrophy of the prostate is of the highest therapeutic importance, since there is thus given a means by which obstruction to urine when it depends upon prostatic enlargement may be safely and permanently removed.

In the paper read by White before the genito-urinary surgeons, May 29, a number of other cases were detailed. It is worthy of note that in practically all obstruction symptoms were markedly relieved within the first one or two days, that the atrophy of the prostate was rapid and progressive, and that cure was complete. The operation itself is practically free from danger. It implies the removal of organs which, from the advanced age of patients suffering from enlarged prostate, are no longer functional, and it promises a speedy cure of an affection in the treatment of which most surgeons are content with palliation, and the only radical treatment heretofore proposed—*i.e.*, prostatectomy—still showing such a large death-rate that there is a natural hesitation in recommending it to those who by simpler and less radical means may be made to enjoy many years of comparative comfort. This comfort is, however, only comparative and does not compare with the relief which they would experience with the obstruction to urine entirely removed. Still, more cases are needed before the merits of this operation will be clearly appreciated, yet a sufficient number have been brought to fully justify the surgeon in castration in suitable cases.

INTRAOCULAR INJECTIONS OF ANTISEPTIC SUBSTANCES AS A THERAPEUTIC MEASURE.

WE have on more than one occasion referred to subconjunctival injections, particularly of bichloride of mercury, as measures suited to control infection processes,—for example, sloughing of the corneal tissue,—or to relieve the manifestations of ocular syphilis, especially when located in the uveal tract, and in the Progress columns of the GAZETTE the most important papers bearing upon this subject have appeared in abstract. In the main, the conclusion has been reached that this is a therapeutic procedure worthy of respect and that it deserves further trial.

To a certain extent these subconjunctival injections, in their modern revival, are an outcome of a proposal by Abadie to control sympathetic ophthalmitis by introducing into the vitreous chamber 2 minims of a 1 to 1000 solu-

tion of sublimate. Indeed, this surgeon, in 1890, not only proposed this plan of treatment, but published the records of cases in which he had successfully employed it. After his announcement occasional reports appeared in the journals confirming his observations, but more frequently the experience of those who followed this recommendation was such that the method was practically abandoned. Abadie himself expressed his willingness to substitute for it subconjunctival injections, provided the latter were proved to be more efficacious, and in August of the past year he gave distinct preference to the subconjunctival injections, although still maintaining that indications for intraocular medication occasionally presented themselves.

Comparatively recent experimental inquiry concerning the effects of intraocular injections of various antiseptic substances has revived interest in the matter, and during the meeting of the International Ophthalmological Congress, to be held in August of the present year at Edinburgh, there will be a special session devoted to this subject.

Two researches bearing directly upon the matter have appeared within the past year, the one by the writer of this article, carried on in the Laboratory of Experimental Therapeutics in the Jefferson Medical College and published in the *Journal of the American Medical Association*, October 21, 1893, and the other by Dr. Chasseaud, from the Laboratory of the Royal College of Physicians in Edinburgh and recorded in the *Journal of Pathology and Bacteriology*, November, 1893, a brief notice of which had previously appeared in the *Ophthalmic Review*, December, 1892.

These experimenters injected various antiseptic substances into the vitreous chamber of rabbits, and noted the effect with the ophthalmoscope and later with the microscope. In the American research the injections comprised bichloride of mercury (1 to 500, 1 to 1000, and 1 to 5000, respectively), cyanuret of mercury (1 to 1000), aqua chlorinata (official strength), blue pyoktanin (1 to 1000), and bichloride of iodine (1 to 1000). The list of drugs employed by Dr. Chasseaud was more extensive, and included corrosive sublimate, carbolic acid, tincture of iodine, camphorated naphthol, hydronaphthol, eucalyptol, boric acid, iodoform, oxycyanide of mercury, peroxide of hydrogen, creolin, pyoktanin, and aqua chlorinata.

Both experimenters found that the last-named drug could be introduced into the posterior chamber of the eye without serious disturbance, and Dr. Chasseaud has reached the conclusion that it is the only substance which fulfils the necessary conditions for a useful intraocular antiseptic, although he is convinced that various fluids may be injected into the vitreous with safety. He found that corrosive sublimate and carbolic acid, owing to their stable compounds with albumin and the inflammatory reaction which they produce, are not so useful as some other less powerful antiseptics; that tincture of iodine, camphorated naphthol, hydronaphthol, and other antiseptic oils are far too violent in their action and cause disorganization of the eye; that boric acid and iodoform are weak and non-irritant; that oxycyanide of mercury and peroxide of hydrogen are good antiseptics, but cause opacities in the vitreous; that creolin is doubtfully antiseptic and very irritant; and that pyoktanin gives rise to neuritis and degeneration of the optic nerve.

The writer's results were less encouraging, as in twenty-four eyes, injected with the substances previously named, only one escaped positive permanent lesion, easily visible with the ophthalmoscope, and situated in the vitreous, choroid, or retina. The one exception, as before mentioned, occurred with aqua chlorinata. Neither were the effects of these substances potent in checking purulent inflammation called into existence by staphylococci emulsion injected into rabbits' eyes; but in one mongrel cur a hyalitis was apparently cured by sublimate injections.

It is evident, then, that there is some hope that aqua chlorinata may prove a useful intraocular antiseptic, although how far these results may be applicable to man, as Dr. Chasseaud concludes, it would be difficult to say. Evidently, as the writer suggested in his first paper, and as Dr. Chasseaud also indicates, a series of control experiments should be performed on dogs, and the study of the relations of the chemical composition of the vitreous to that of the fluid injected should be more exact.

Reports on Therapeutic Progress.

THE ACTION OF THE CARLSBAD THERMAL WATER ON THE STOMACH FUNCTIONS.

JAWORSKI has investigated the action of the Carlsbad thermal water, and found that it excited the secretion of acid and pepsin by the stomach and promoted the passage of the stomach's contents into the intestine. When, however, it was used for from four to six weeks, he

found that the acidity of the stomach was diminished, the secretion of pepsin steadily lessened, the resorptive power suffered, so that in certain cases no irritant longer sufficed to obtain gastric juice of digestive power. On too long use of the water the digestive power was wholly lost. Only in a small number of cases were acidity and digestive power raised. The mechanical function seemed likewise in a few cases to be increased.

These unexpected results induced Ewald and Sandberg to try the water for four weeks in the case of ten persons. Their results contradict Jaworski's.

Finally, W. SPITZER (*Therapeutische Monatshefte*, April, 1894) endeavors to solve the question. Having first satisfied himself that single doses of the water promote the gastric secretion in healthy individuals, he examined systematically eighteen persons suffering with gastric disorders. Of the eighteen, five suffered with chronic mucous catarrh, two of them with severe grades (atrophy?); three had excess of HCl (one with motor insufficiency); one had cancer of the stomach (?) with motor insufficiency; three had pure atony; six suffered with various forms of nervous dyspepsia (anacidity, nervous eructations, gastralgia, etc.). The persons experimented on received early in the morning, fasting, the thermal water and Carlsbad salt; one hour later an Ewald test-breakfast; the gastric contents were removed in from one to two hours later.

The results obtained are as follows:

1. In most of the cases the motor power was increased; in none of them was it injured. The result was most decided in the cases of motor insufficiency which were not too severe. Even in the doubtful case of cancer, in which in the first days a residue of about three hundred cubic centimetres was expressed from the fasting stomach, after three weeks' use of the water the stomach was found empty one and a half hours after the test-breakfast.

2. After the completion of the cure the pepsin action showed no essential diminution in cases where it had been present at first, and in the mild cases of chronic catarrh there was a decided increase.

3. The HCl secretion varied, but only within physiological limits. The superacid values sank to normal, but not essentially lower. The two cases of atrophic gastritis exhibited after, as they did before, treatment no trace of HCl. But the doubtful case of cancer which showed before notice free HCl exhibited it afterwards in profuse quantity.

4. The pepsin action proved not to be dependent upon the acidity, so that when the acidity fell the pepsin secretion showed no diminution.

5. The rennet ferment showed, on quantitative testing, never a diminution, but often an increase.

METHYLENE-BLUE IN MALARIAL AFFECTIONS.

ERNST FRATNICH (*Therapeutische Monatshefte*, April, 1894), following Guttmann, has employed methylene-blue in four cases. The urine was stained intensely blue, but contained no albumin. No strangury occurred. The stools and saliva were intensely blue. Plasmodia were demonstrated in the blood in two cases. The remedy seems to have stopped the fever and cured the patient in three of the cases. In the fourth case quinine was administered by mistake.

THE TREATMENT OF CHRONIC RHEUMATISM.

We published not very long ago an abstract of an article by DUJARDIN-BEAUMETZ on the treatment of acute articular rheumatism. The same author has in a later contribution (*Bulletin Génér. de Thérapeutique*, February 15, 1894) critically examined the therapeutics of the chronic form of the disorder. In that form of rheumatism, accompanied with deformities, with no history of an acute attack or of cardiac lesion,—as that, for example, which constitutes gout of females,—the medication should better be directed towards combating a disordered nutrition. It is in this condition that arsenic and the iodides appear to be better indicated. Arsenic, however, is often followed by painful phenomena, and it is in these cases that iodine or the iodides should be exclusively used. The iodides are to be preferred, and the following prescription is recommended:

℞ Iodide of potassium, 4 drachms;
Water, 8 ounces. M.

Sig.—A dessertspoonful in sweetened black coffee after each principal meal.

The chloride of gold and sodium, recommended by some practitioners, the author believes to be irritant, notwithstanding its alleged beneficial influence over nutritive processes. In cases of rheumatism attended with painful symptoms the salicylates do no good, and the only remedy that has apparently given satisfactory results in such cases is phenacetin, particularly paracetphenetidin in doses of .5 gramme, twice or thrice a day, in the form of cachets. Besides internal medication, diet is of the utmost

importance; the latter should consist of meats well done or rare, green vegetables, generous wines, and the use of milk, especially while the patient is taking the iodides. To make the treatment more complete, massage, electricity, and balneotherapy should be added under proper conditions.

In the true form of chronic rheumatism, particularly in the acute stages, the salicylates, asaprol, and more rarely phenacetin, may be employed with advantage. Certain other remedies are of service not only for the time being, but also to prevent relapses. The author refers to the following mixture, alleged to be advantageous, but which he has not employed, mentioning it only on account of its popularity:

℞ Powder of colchicum bulbs, 5 drachms;
Powder of bryonia root, 3 drachms;
Powder of betony, 12 drachms;
Powder of gentian, 3 drachms;
Powder of common chamomile, 3 drachms.
M. and divide in 15-grain powders.
Sig.—2 powders a day.

Another plant thought to possess remedial virtues in chronic rheumatism is the bean, especially the flowers. But, after all, the best results in this form of the disease are obtained from external medication, and it is these cases in which massage, electricity, and balneotherapy are of peculiar advantage. Massage, methodically applied, combats not only the functional weakness of the articulations, but especially so the muscular atrophy accompanying this kind of arthritis. Electricity, through the continued or slowly-interrupted currents, also modifies the atrophied muscles. The utility of balneotherapy is unquestionable, particularly by means of thermal waters. Diet, of course, is important. Without entirely suppressing meat or wine, a mixed diet, with a large amount of vegetables, is to be preferred. Highly-seasoned food should be avoided. The condition of the bowels and kidneys should claim attention; the regularity of their functions should be maintained by the administration of proper laxatives and diuretics. The latter treatment may also be applied to rheumatic diathesis, where, indeed, hygiene and balneotherapy are the most important measures to be employed.

THE TREATMENT OF DIARRHŒA.

Under the above title, SAPELIER (*Bulletin Génér. de Thérapeutique*, February 15, 1894) writes an exhaustive article. For the *indigestion* that accompanies the disorder he believes that an expectant treatment, diet, and stimulants are sufficient. To enhance the elimination of toxines resulting from the indigestion, saline purgatives are indicated. In *acute intestinal catarrh* saline purgatives are of service, followed by the administration of this mixture:

℞ Paregoric, 1 to 3 drachms;
Subnitrate of bismuth, 1 to 2 drachms;
Extract of rhatany, 1 drachm;
Syrup of comfrey, 2 ounces;
Lime-water, q. s. for 5 ounces. M.
Sig.—A dessertspoonful every two hours, according to indications.

A milk diet, bouillon deprived of all fat, and lactated or plain lemonade are to be conjoined.

In *chronic intestinal catarrh* antiseptic purgatives are to be employed, the first of which is calomel in large quantities (8 to 10 grains at one dose) or in fractional amounts (1 to 2 grains a day during several days). Opium may be associated. Regarding intestinal antiseptic remedies, the author speaks of the salicylate of bismuth, betol, salol, benzonaphthol, benzoate of bismuth, dermatol, resorcin, lactic acid, etc. The salicylate or the benzoate of bismuth may be given in doses of from 30 grains to 6 drachms a day; salol, in from 15 to 45 grains every twenty-four hours, in cachets of 8 grains each; the same dosage is mentioned for betol. Lactic acid is recommended in the form of a lemonade, according to the following formula:

℞ Lactic acid, 5 drachms;
Simple syrup, 6 ounces;
Boiled water, 1 quart.

The author also advises the use of benzonaphthol in doses of 1 drachm during the twenty-four hours, in cachets of 8 grains each. The association of opium is thought to be of service, and the following combination is recommended:

℞ Subnitrate of bismuth, 8 ounces;
Carbonate of calcium,
Phosphate of calcium,
Powder of rhatany, of each, 2 ounces;
Powder of crude opium, 45 grains.

This is to be administered in the lactated lemonade, in doses of from 2 to 3 dessertspoonfuls a day, each dessertspoonful containing 1 drachm of bismuth, 15 grains each of carbonate of calcium, phosphate of calcium, and the powder of rhatany, and 1 grain of the powder of opium. Owing to the disagreeable taste of the opium, it is advantageous to administer it in the form of laudanum in rectal injections of starch; 5, 10, or 20 drops

of laudanum are used for one injection, the injection being exhibited after each passage. These injections diminish the rectal tenesmus as well as the colicky pains.

In *hemorrhagic diarrhœa* recourse is had to the administration of the perchloride of iron by the mouth as well as by the rectum, associated with the hydrochlorate of morphine. In the same conditions alum is of advantage, and may be administered according to these prescriptions:

1. ℞ Pulverized alum,
Catechu, of each, 5 grains.
M. and make four pills.
Sig.—3 to 6 pills per day.

2. ℞ Alum,
Catechu, of each, 2 grains;
Crude opium, ¼ grain;
Syrup of red roses, q. s.
M. and make one pill.
Sig.—12 pills per day.

For *chronic catarrhal diarrhœa* the treatment is thus summarized by the author: (*a*) Absolute milk diet; a small cup of milk should be taken in a slow manner every two hours. To this amount of milk may be added a dessertspoonful of lime-water or Vichy-water. (*b*) At the same time a cachet of either of the following combinations may be administered:

1. ℞ Benzonaphthol,
Benzoate of bismuth, of each, 5 grains.

2. ℞ Benzonaphthol, 5 grains;
Salicylate of bismuth, 8 grains.

Or,

℞ Dermatol, 5 grains.

(*c*) Similarly every two hours, but in the intervals between the cups of milk, a dessertspoonful of either of the following mixtures may be taken:

1. ℞ Elixir of paregoric, 1 to 2 drachms;
Tincture of catechu, 2 to 4 drachms;
Syrup of comfrey,
Syrup of quince, of each, 1 ounce;
Peppermint-water, q. s. for 5 ounces.

2. ℞ Extract of rhatany, 1 drachm;
Syrup of morphine,
Syrup of quince, of each, 12 drachms;
Lime-water, q. s. for 5 ounces.

3. ℞ Liquid perchloride of iron, 8 to 15 grains;
Sydenham's laudanum, 20 to 30 drops;
Mucilage of gum arabic,
Simple syrup, of each, 1 ounce;
Cinnamon distilled water, q. s. for 5 ounces.

(*d*) In the intervals between either of the preceding mixtures and the milk accompanied with the cachets, the lactated lemonade mentioned before may be administered in glassfuls. (*e*) If there is much tenesmus, after each passage a starch injection with 5 or 10 drops of Sydenham's laudanum may be employed by means of a small syringe. (*f*) At the same time warm applications to the abdomen should be used, by means of flannel or rubber bags filled with warm water. If flannel is used, this may be dipped in the following liniment:

℞ Oil of hyoscyamus,
Camphorated oil of chamomile,
Rousseau's laudanum, of each, 1 ounce.

In the *diarrhœa* of warm climates the author refers to Le Dantec's prescription, which is as follows:

℞ Saturated chloroform-water,
Distilled water, of each, 4 ounces.
Sig.—In teaspoonfuls by the mouth several times in the course of the day.

For *mountain diarrhœa* the best treatment is said to consist in the use of intestinal antiseptics, particularly the biniodide of mercury in solution, and pepsin. The mercury is given fifteen minutes before and the pepsin (in doses of 8 grains) two hours after each meal.

In the *diarrhœa of Asiatic cholera*, as well as in the simple choleraic forms of diarrhœa, salol in large doses is said to be an excellent remedy. In the epidemic of Asiatic cholera at Nijnii-Novgorod, in 1892, Volkovitch gave salol in doses of from 2 to 4 drachms in the twenty-four hours, beginning with 15 to 30 grains as the first dose, according to the condition of the patient, and then repeating the same amount every three hours, or every four, five, or six hours if improvement persisted. Under this treatment, in the first twelve hours the diarrhœa diminished and the passages ceased to be rice-water-like, and nausea and vomiting disappeared. No symptoms of poisoning by the drug were noticed, even when the remedy was employed in large quantities. To children, salol may be administered every three or four hours, in doses of two grains for each year of the age.

The treatment of *sporadic dysentery* is thus summarized, according to Grasset:

1. A draught of water before breakfast.

2. Followed, every two hours, by a bowl of milk, and with this a cachet of this combination:

℞ Benzonaphthol,
Benzoate of bismuth, of each, 5 grains.

3. If this is not sufficient, a spoonful of the following mixture:

℞ Ipecacuanha, 1 to 2 drachms.
To be infused in 3 ounces of water, and to which is added 1 ounce of syrup of poppies.

4. Morning and evening a rectal injection of 1 to 2 pints of borated water of the strength of two per cent., followed by another injection of linseed (1 pint), with 15 to 150 grains of benzoate of bismuth and 10 drops of Sydenham's laudanum.

5. The patient is allowed to take gradually of ordinary mixed diet. The antiseptic cachets are continued for a long time.

6. A change of climate, as, for instance, a stay at a health resort.

Syphilitic diarrhœa yields to treatment by the specific remedies. The diarrhœa occurring in acute rheumatism, unless it be severe, is better left alone. That of *arthritism* requires a constitutional treatment. The *diarrhœa of tuberculous patients* may be treated in the same manner as the chronic form already referred to. When the diarrhœa is the result mainly of paludic intoxication, quinine, of course, is the remedy *par excellence*.

TREATMENT OF TUBERCULAR PERITONITIS BY INSUFFLATIONS OF AIR.

It has been demonstrated in some instances that air exercises a special action on tubercular peritonitis. It has been found sufficient to open the abdomen, exposing this to the air for a few moments, the procedure being followed often by a cure. Bearing these facts in mind, DURAN (*Revista de Ciencias Mèdicas de Barcelona*) has employed the following method in two cases of tubercular peritonitis accompanied with ascites. After evacuating the liquid by means of a common trocar,—in one case he removed eight litres (fourteen pints), and in the second case, twelve litres (21.1 pints),—he insufflated as much air as possible into the peritoneal cavity through the same trocar. The air had previously been made to pass through caustic potash moistened with phenic acid. The air was allowed to remain in the cavity for a few moments and then let out, after which a light compress was applied. The patients were somewhat feverish and had slight nausea during two days. Tympanitis persisted for about eight days and then it began to subside. Gradually the abdomen regained its normal size, and in about six weeks a complete cure was effected. These two cases are certainly interesting, and the method employed seems to be worthy of further trial. Its application is, indeed, simple and devoid of danger as long as sufficient antiseptic precautions are taken.—*La Mèdecine Moderne*, March 3, 1894.

EXOTHYROPEXIA IN EXOPHTHALMIC GOITRE.

JAROULAY (*La Mèdecine Moderne*, March 3, 1894) relates a typical case of exophthalmic goitre occurring in a young lady nineteen years of age, and two other cases of goitre without exophthalmia, in all of whom the practice of exothyropexia produced excellent results. In all of the three cases the disappearance of the palpitations, the excitement, and the tremors coincided with the diminution of the goitre. In one of the cases the thyroid assumed its normal size and recovery ensued. The young lady, in whom the disease was typical, suffered a relapse, but after a second operation again experienced the same good results as she did after the first exothyropexia.*

THE TREATMENT OF CHOREA.

In an interesting article DUJARDIN-BEAUMETZ (*Bulletin Gènèr. de Thèrapeutique*, March 15, 1894) reviews the therapeutics of chorea, and then gives his personal experience in the matter. In chorea of rheumatic origin, antipyrin does good in doses of 4 grammes (60 grains) per day. According to Legroux, this medicament brings about a cure in from fifteen to twenty days of treatment, this result being obtained especially in the declining period of the malady. Antipyrin does not suffice in serious cases; in these instances chloral in large quantities is the better remedy. Chloral is well borne by children. Bouchut has given it in doses of from 3 to 5 grammes (45 to 75 grains) in the twenty-four hours. Local measures, in both mild and grave cases of rheumatismal chorea, are advisable, such as cold-water douches, or, better still, ether spraying along the vertebral column. In some cases massage and gymnastic exercise are of advantage, the latter being particularly indicated in the declining stages of the disease. In hysterical chorea the treatment is different, particularly when the signs of the nervous element are well established. In this form of the disorder bromide of potassium and hydrotherapy are the

* Exothyropexia is the operation for goitre in which the gland is loosened as much as possible and brought outside the incision, where it is allowed to atrophy.—ED.

best agents and more apt than others to bring about a cure. Bromide of potassium must be given in large doses,—that is, from 2 to 4 grammes (30 to 60 grains) a day. The following solution is recommended:

℞ Bromide of potassium, 15 grammes (℥iv);
Water, 250 grammes (℥lxvi). M.
Sig.—2 to 4 spoonfuls a day in a little black coffee.

Sometimes it is necessary to associate a tonic. If chlorosis exists, as in the case of young girls, arsenic is given at the same time. Hydrotherapy is a necessary adjuvant, since it acts not only as a stimulant to the nervous system, but also combats successfully the depression caused by the prolonged administration of the bromides, especially the potassium salt. This measure is best applied in the form of a cold douche, first over the vertebral column, and, finally, in the form of a warm douche over the lower extremities. When the nervous excitement is extreme, lukewarm douches are to be employed at the beginning of this treatment, the temperature of the water being gradually diminished. In some cases the disease is so intense as to make the douches difficult of application; in such instances the body should be wrapped with wet sheets for a period of from ten to fifteen seconds, after which the patient is to be covered with warm clothing. Massage and gymnastics may also be applied in suitable cases, taking the same precautions referred to in speaking of the treatment of rheumatic chorea. In the paralytic form of the disease the bromides should be avoided. In these cases wrapping the body in wet sheets is the best measure to be employed, and in regard to the use of drugs, hyoscyamine, as proposed by Oulment, is but little employed now. Magnan has suggested the use of hyoscine hypodermically. The following formula is recommended:

℞ Hydrochlorate of hyoscine, .01 gramme (gr. $\frac{1}{6}$);
Boiled water, 5 grammes (f℥i$\frac{1}{2}$). M.
Sig.—1 to 2 milligrammes (gr. $\frac{1}{60}$ to gr. $\frac{1}{30}$) of the active principle for each injection.

Finally, erosions and ulcerations of the skin, which occur as inflammatory complications, should be treated with antiseptic lotions. According to Dujardin-Beaumetz, there is no specific treatment for chorea.

INTRAVENOUS INJECTIONS OF CORROSIVE SUBLIMATE.

At the meeting of the Eleventh International Medical Congress, in Rome, GUIDO BACELLI (*Berliner Klin. Wochenschrift*, March 26, 1894) said that intravenous injections had been suggested by him and employed for the cure of malaria. Professor Nothnagel maintains that they are unnecessary, as subcutaneous injections can accomplish just as much without disagreeable consequences. But Bacelli's results, published in 1890, were brilliantly successful as regards the treatment of severe forms of malaria with intravenous injections of neutral salts of quinine, and they contradict Nothnagel's opinion. Since then Bacelli has experimented with corrosive sublimate given by intravenous injections for syphilis. Experiments upon animals were tried first. He then tried the new method in two cases of cerebral syphilis which had resisted cure by other methods, including inunction and hypodermic injections of mercury and iodide of potassium in large doses. The results were excellent. Other cases followed, so that now the method is employed by many Italian physicians. The solution Bacelli employs is as follows:

Hydrarg. bichlor., 1 part;
Sodii chlor., 3 parts;
Aq. dest., 1000 parts.

The skin is cleansed and rendered aseptic, and a syringeful of the solution is injected into a vein at the elbow, back of the hand, or thigh. The veins are first made prominent by constriction. The injection must be into the lumen of the vein, otherwise pain and swelling will result. In a few minutes (five to six) mercury is excreted in the saliva. The "cure" begins with the injection of 1 milligramme of corrosive sublimate daily,—that is to say, 1 cubic centimetre of the solution (1 to 1000); then the quantity increases from 2 to 8 milligrammes (the maximum dose). For four milligrammes a two-per-cent. sublimate solution may be employed, so as to avoid the injection of too large a quantity of fluid. In exceptional cases he begins the treatment with doses of 4 to 5 milligrammes.

Bacelli calls special attention to the following points: 1. The small quantity required. 2. The possibility of overcoming many symptoms quickly,—symptoms which indicate direct blood-poisoning with the syphilitic virus. 3. The benefit and widely-distributed action upon vessel walls which are the specially-favored seat of syphilitic alterations.

Bacelli also employs sublimate injections for the cure of echinococcus cysts. The cyst is punctured and about thirty cubic centimetres of the fluid withdrawn through a trocar; 20 cubic centimetres of one-per-mille sublimate solution are then injected, the trocar withdrawn,

and a dressing applied. In five days the patient is dismissed cured. The parasite is killed, and the subjective and objective symptoms subside by degrees.

TREATMENT OF TYPHOID FEVER WITH LACTOPHENIN.

Lactophenin is soluble in water; it forms a crystalline powder of a slightly bitter, not unpleasant, taste. It has been tried successfully in the treatment of a variety of disorders. PROFESSOR R. VON JAKSCH (*Centralblatt für Innere Medicin*, March 17, 1894) reports its use in eighteen cases of typhoid fever. Among these were cases with a temperature remaining for days above 104° F., great clouding of the senses, and extreme prostration of the strength; also cases with severe symptoms on the part of the kidneys and some with severe hypostatic pneumonia.

He is quite willing to admit the possibility of chance in these favorable results; but, aside from the favorable results, there were other advantages observed at the bedside which distinguished this from other antipyretics and sedatives. The dose was 7 to 15 grains lactophenin, given in starch capsules. Just according to the antipyretic and quieting action produced in each case, this dose can be repeated during the day to as much as would amount to 6 grammes a day.

Von Jaksch has thus far observed no harmful action from this remedy. Besides these eighteen cases of typhoid fever, he has also used it in thirty-three cases of the most varied diseases, including polyarthritis, influenza, scarlatina, sepsis, etc. Here, also, far more than a thousand separate observations showed neither harmful action nor any unpleasant one to the patients. Dr. Riedel will report these observations at length elsewhere. In one single case, after the first dose of ½ gramme, vomiting and illness occurred; the succeeding doses caused no discomfort, and the remedy worked as well as in the other seventeen cases. Twice they observed a somewhat arhythmic pulse. As this was not found in hundreds of other observations, it may be questioned whether it should be blamed upon the action of the lactophenin. He also adds that in neither blood nor urine were symptoms observed which would indicate an unfavorable action of the fluid.

The urine showed in the cases treated with lactophenin the para-amidophenol reaction. The lactophenin excels because the reduction of temperature is gradual and lasts for hours, and, further, the increase of temperature is not accompanied by a rigor, even when the change of temperature is rapid. There was one exception to this.

Lactophenin has an uncommonly calming effect on the typhoid patient. Delirium vanishes, the senses become clear, and, without exception, the patients rejoice in a subjective healthfulness such as Von Jaksch has until now never observed under any other mode of treating typhoid. It was also noted that hunger soon occurred in all cases; in fact, most of them as soon as lactophenin had been given a few days, and they were speedily cured.

It is still not possible to decide how far chance played a part here, as all the cases which he had observed since using lactophenin were those rapidly cured, or how far this rapid favorable course is to be ascribed to the lactophenin.

While withholding final decision as to its absolute value, and whether in it a specific for typhoid fever has been found, Jaksch warmly commends lactophenin on the strength of these observations.

INTOXICATION WITH LYSOL AND CARBOLIC ACID.

That lysol, although less poisonous than other antiseptics, must be kept out of the reach of the children we are reminded by DR. FRIEDEBERG (*Centralblatt für Innere Medicin*, March 3, 1894). After referring to two other cases recently reported, he tells of one which came under his care. A child one year old drank about ten grammes pure lysol. The physician called ordered warm milk, which the child drank without vomiting, and he then sent it to the hospital. Here its stomach was washed out with a pint of warm water. Then 15 grammes of a mixture of magnesia was introduced through the stomach-tube. This was followed by a second vomiting. The child could not swallow milk. It recovered rapidly, the cauterized places healing well. It was evident that only a very small amount of the lysol was absorbed, as the urine remained unchanged.

He also reports a curious case of poisoning with carbolic acid. A woman forty-one years old used, by mistake, a quart of two-and-a-half-per-cent. solution of carbolic acid as a clyster at 10 A.M. In five minutes she became unconscious. A clyster of 500 grammes of lime-water was given promptly; at first most of this was retained, then spontaneously evacuated, the patient being quite unconscious; 4 grammes of a solution of 1 part of camphor to 4 parts of olive oil were given subcutaneously. At 1 P.M.

the pulse was stronger and breathing quiet; the patient swallowed wine without awakening; another evacuation occurred; 10 grammes of a solution of sulphate of sodium (10 to 100) was given subcutaneously. At 2.30 P.M. the patient recognized her surroundings; she was very weak; the next day she was well; there was no change in the urine.

A CASE OF PSEUDO-BILIARY COLIC WITH OBSTRUCTION OF THE COMMON DUCT. SOME ACCOUNT OF THE PHARMACOLOGICAL ACTION OF CALOMEL AND OLIVE OIL.

VICTOR SCHULTZ reports at length (*Berliner Klinische Wochenschrift*, No. 6, 1894) a case of apparent biliary colic, and the observations and examinations by which he proved that there were no gall-stones present. He found that olive oil produced a marked increase in the secretion of bile, and that the favorable action of calomel on gall-stones and diseases of the bile-duct is not due to an increase in the secretion of bile, but to its disinfecting properties, which rapidly change the composition of the bile and thus diminish the abnormal irritation of the mucous membrane of the gall-bladder.

TREATMENT OF DIABETES.

In the *Indian Medical Gazette* for March, 1894, FERMIE writes that in treating diabetes it ought to be borne in mind that a dietetic treatment of an appropriate kind is most important, more especially in middle-aged people, and this bears out the rule of Prout, who laid it down long ago that "diet is the first and chief point to be attended to."

The diet ought to be so regulated as to prevent sugar being formed from the food, so that all sugar-forming food must be prohibited. This prohibition should be gradual and not abrupt. Its place, however, must be supplemented by assimilable oil or fat food, such as cream, cod-liver oil, butter, cheese, fat bacon, ham, and meat to any quantity, except liver.

Too much milk should not be allowed, nor should pastry, potatoes, beet-root, puddings, and farinaceous substances be allowed at all. The highly-advertised diabetic foods, if really prepared, as stated, without starch, will be very beneficial, and will supply a want long felt in filling up the gaps made by the prohibition of articles of food which long use has made almost indispensable, and renders the patient less discontented with the task set before him and more amenable to treatment. The gluten and almond biscuits prepared for the victims of diabetes are so pleasant to the taste that invalids require no encouragement to use them. Diabetic food may also be sweetened with saccharin tabloids.

It is necessary to regulate the drink as well as the food of diabetic patients. Water should only be drunk in moderation, while chocolate, sweet ales, cider, and all sweet and sparkling wines should be forbidden; in fact, it is inadvisable to take alcohol in any form.

So far as drug treatment goes, there is none which may be termed consistently satisfactory. Codeine certainly, in combination with a strict diet, has a beneficial result. It may be given in ¼- or ½-grain doses three times a day at first, then less frequently. Dr. Mitchell Bruce thinks that opium or its derivatives should not be used until the full effect of a strict diet has been tried; but clinical experience goes to show that codeine can and ought to be given coincident with a strict diet; one acts as an adjuvant of the other and hastens the process of cure. Professor Fraser thinks that morphine is more effective in some cases than codeine.

Salicylate of sodium is regarded with favor by some, especially in those cases where opium is contraindicated.

In treating diabetic coma, early and thorough purging with a large dose of calomel is about the best, followed by stimulants and doses of potass. acetas with digitalis every hour at first and then less frequently.

THE MODERN TREATMENT OF DIPHTHERIA.

FISCHER, of New York, contributes the following conclusions to the *Post-Graduate* for April, 1894:

1. Local disinfection.—careful distinct nasal antisepsis by means of naso-pharyngeal irrigation; this can be done by irrigating with warm salt water (1 drachm to the pint); the addition of bichloride of mercury (1 grain to the pint), or of borax (1 to 2 drachms), or acid salicylic (4 grains to the pint), is regarded as an improvement by some. It should be thrown with enough force to flow out the other nostril and partly by the throat. Tearing the membrane or using force will cause epistaxis, and is not advisable. Jacobi says, in his treatise on diphtheria (p. 208), "When they see benzoate of sodium destroying bacteria in a glass vessel, they take it for granted that the human system will permit of the same action as a glass vessel. Thus, benzoate of

sodium is sent into the stomach or into a pulmonary artery under orders to do the same as it does in the laboratory. The drug has in consequence had a short life after having been extolled in a very limited time by microscopists, etc." Jacobi concludes by saying that as an antidiphtheritic or antipyretic it utterly failed.

Frequent applications of pepsin, trypsin, or papayotin with a medicine-dropper may be indicated in some abstract cases. Naso-pharyngeal irrigation will cause the neighboring enlarged glands to become reduced in size quicker than all other treatment combined.

2. Sponging with peroxide of hydrogen hourly.

3. Internal administration of stimulant drugs,—ferric chloride for tonic effect. Alcohol, no matter at what stage, is indicated in all cases of septicæmia, be they diphtheritic or not.

4. Liquid diet,—milk, beef-tea, milk-punch; rectal feeding, if necessary.

5. Local applications of cotton swabs, moistened with bichloride (1 to 1000 to 1 to 500), applied with great pressure every two hours, as an abortive plan of treatment, if the case is seen early.

6. Antipyretics. If at all useful, salicylate of sodium is the best, in doses of 2 to 15 grains every hour or more, according to the age and tolerance of the patient. If the drug is not well borne, then antipyrin or antifebrin may be given.

The temperature in uncomplicated cases of diphtheria has given little trouble, except when complicated by scarlatina.

Cold applications—cracked ice and ice-cream—are very grateful to patients. Calomel, to empty the bowels and reduce the temperature, is a mercurial salt, besides being a valuable intestinal antiseptic. Orange- and lemon-juice are also highly beneficial.

The complications and their management must be considered in each case. So must the question of both intubation and tracheotomy, to which the author only refers. Every case must be studied, and the treatment based on the previous habits, the general condition, the severity of the attack, and the amount of the infection.

TREATMENT OF CHOREA.

In giving his views as to the treatment of chorea, DR. DUJARDIN-BEAUMETZ (*Bull. Gén. de Thér.*, March 15, 1894) first distinguishes between chronic chorea, which he points out as incurable, and acute chorea, or "chorée de Sydenham." The most common cause of the latter is usually said to be rheumatism, but he thinks at the present time that the greater proportion of cases are of nervous or hysterical origin. The rheumatic and nervous influences often coexist in the same patient. He also points out that while in some inco-ordination is the leading phenomenon, in others loss of motor power is the most marked feature.

In chorea owning a rheumatic origin salicylate of sodium often fails. Antipyrin is the best remedy. Of this, 15 grains may be given four times daily. He has tried exalgine in doses of 45 grains daily, but without success, though Dana and Loewenthal, giving larger quantities (60 to 100 grains daily), have reported it useful.

Cure by antipyrin takes fifteen to twenty days to accomplish. In severe cases it is necessary to give hypnotics, and chloral is the best, the more so as it is well borne in large doses by children; as much as 45 to 60 grains daily may be given to infants.

If, on careful examination, no cardiac disease is present, the cold douches may be employed, or ether spray along the spinal column. In the period of the decline of the attack, massage and gymnastics are useful.

In chorea of hysterical origin the treatment should be quite different. Young girls of from twelve to fifteen are mostly attacked with this form of chorea, and other indications of hysteria, such as anæsthesia, are often present. Bromide of potassium, in doses of 30 to 60 grains daily, is here the best remedy, and arsenic may be given at the same time. Hydrotherapeutic treatment should be employed; the cold douche to the vertebral column, followed by a warm douche upon the lower extremities, is a good form. If there be much nervous excitation, the douche should be tepid. In very severe chorea of this kind the cold wet sheet should be used for ten or fifteen seconds, after which the patient should be surrounded by hot coverings; ether spray along the spinal column may be employed when other means cannot be adopted or when the patient supports the wet sheet badly. Massage as gymnastics may be employed here as in other forms of chorea. In that form of chorea in which muscular weakness is the most marked feature the bromide is not advisable; the cold wet sheet is the best means of treatment. With regard to other means that are employed, Dujardin-Beaumetz expressed himself as opposed to powerful drugs, such as strychnine, curare, etc. Chorea, he says, tends to get well itself, and it is not wise to interfere too actively.—*Medical Chronicle*, April, 1894.

VERATRUM VIRIDE AS A REMEDY IN PUERPERAL ECLAMPSIA.

DAVIS records the results of the use of veratrum viride during twenty years' practice, in the *Virginia Medical Monthly* for April, 1894.

The author's object in writing is to show that veratrum viride will control puerperal convulsions when administered in large doses, and that it is perfectly safe to administer it in sufficient quantities to control any case of convulsions, and he has reported a few cases to prove that his remarks are based not only upon a theory, but upon actual experience.

In conclusion, he states that he has used the tincture of veratrum viride successfully in the treatment of every form of convulsion except traumatic tetanic convulsions, and he does not hesitate to use it in conjunction with other remedies in such a case whenever he has an opportunity, with the hope of relief.

He claims to have used veratrum viride in larger doses than it was generally known that it could be used at the time he commenced to use it in the treatment of convulsions. He had never seen it recommended in such quantities (20 to 60 drops), and hence used it on his own responsibility. His experience convinces him that it is both safe and efficient in the treatment of convulsions.

GUAIACOL AS AN ANTIPYRETIC.

FRIENDENWALD and HAYDEN report a series of cases in which they have used guaiacol for this purpose. They think they are justified in concluding,—

1. That this drug has a powerful antipyretic action, occasioning a reduction of from one to four degrees of temperature in from one to four hours.

2. That in all cases this reduction of temperature is accompanied by profuse diaphoresis, which may or may not be accompanied by a chill or chilly sensation.

3. That great exhaustion is frequently produced.

4. That the effects may be obtained from comparatively small doses (from 30 to 50 drops), and that great care should, therefore, be exercised in the use of the drug. The drug should be applied but once or twice daily, and the initial dose should not be above 30 drops.

5. That the effect produced by guaiacol, though more powerful, is the same as is obtained from most of the other antipyretics of the coal-tar series, and that the same care must, therefore, be exercised as with the other preparations. Its effect differs widely from the stimulating cold bath in being depressant.

6. That the main indication for its use is in diseases accompanied by high fever in which the cold bath cannot be applied. It may, therefore, be especially useful in typhoid fever as well as in all other diseases accompanied by high fever in which irritability of the stomach prevents the use of other antipyretics.

TREATMENT OF TUBERCULAR PERITONITIS.

DR. CARL BECK, of New York, read a paper with this title before the Eleventh International Medical Congress, the conclusions of which were as follows:

1. A diagnosis of tubercular peritonitis in the early stages is possible only in exceptional cases.

2. The injection of an iodoform-glycerin mixture (1 to 10) into the abdominal cavity has a specific antitubercular action.

3. As this treatment is useful in other peritonitic troubles, it is particularly indicated in all doubtful cases.

4. The employment of iodoform in powder or solution is indicated after laparotomy whenever it is desired to limit secretion.

5. The absorption of the products of streptococci appears to be made less virulent in its results by the coabsorption of iodoform.

Of five cases of general peritonitis treated in this way, only one resulted fatally.

ADMINISTRATION OF ANÆSTHETICS CLINICALLY CONSIDERED.

WHITE (*Medical Press and Circular*, March 14, 1894) ends a paper with the above title as follows:

We should as a preliminary step endeavor by every possible means to encourage a patient in the prospect of an operation, to remove any undue fear, and to render him tranquil at the time of administration.

For three or four hours before the use of an anæsthetic no food should be taken, unless it be a few spoonfuls of liquid nourishment, or vomiting, with its ill consequences, is almost sure to take place.

The patient should always, if possible, be placed in a horizontal posture. All tight clothing should be carefully set free or removed, and the neck and chest of the patient relieved of the slightest pressure. The undivided attention of the anæsthetist should be

given to the patient during the whole period of administration.

The patient should be kept as quiet and cheerful as possible when inhalation is begun. There should be no noise about him, and he should never be spoken to or disturbed until sleep takes place.

Inhalation should be commenced very gradually, beginning with a free admixture of atmospheric air, and the proportion of anæsthetic vapor slowly increased.

If struggling occurs, we should admit more air or remove the inhaler. When struggling subsides, we should gradually resume the anæsthetic and endeavor to maintain regular breathing until the conjunctiva begins to be insensible; then the pupil oscillates between dilatation and contraction and the eyeball slowly rolls in its orbit.

The eyeball then becomes fixed; the conjunctival reflex becomes more and more feeble and then disappears. The pupil will now be found to be fully contracted and the condition of *sleep* is attained.

This condition of sleep can be kept up for a considerable time. As soon as there is full contraction of the pupil the inhaler should be removed, and gently reapplied if the pupillary contraction passes off and the eye begins to move. This renewed movement of the eyeball and diminishing contraction of the pupil invariably usher in returning consciousness.

The movements of the pupil and of the eyeball and the conjunctival insensibility *pass off in an inverse order to that of their accession*, and afford the most accurate guide for any necessary renewal of the anæsthetic.

An operation should never be commenced until this condition of sleep is reached. The slightest disturbance of a patient, either by noise, or by a slight puncture, or by movement, will so rouse him as to render him dreamy and excited, and will generally produce a depressing action both on the respiration and the pulse.

If stertorous breathing should occur, with fixed eye and dilated pupil, inhalation should immediately be stopped.

We should never, unless necessary, attempt to rouse a patient suddenly from his sleep by slapping, etc. The free admission of air to the apartment and to the face and cheek of the patient, and, if necessary, gentle application of ammonia to the nostrils, are the best restoratives in ordinary cases of *excessive* anæsthesia. And, lastly, we should most carefully watch the state of respiration and pulse and the condition of the pupil and aspect of the countenance during the whole period of inhalation; and if the respiration or pulse fail, we should have immediate recourse to artificial respiration, free admission of air, and application of ammonia to the nostrils, and, if necessary, we should gently but regularly maintain artificial respiration for at least half an hour.

White believes that there is, as stated by the chloroform committee of the Royal Medical and Chirurgical Society, a considerable advantage in the use of mixtures of ether and chloroform over that of chloroform alone.

For many years he has employed the A. C. E. mixture almost exclusively, and has given it in nearly fifteen hundred cases. It is certainly less depressing than chloroform and not appreciably more irritating to the pulmonary mucous membrane. He has so far never seen any but the most favorable results from its use, and believes it is decidedly more free from danger than chloroform by itself.

THE DIGESTIVE ACTION OF PAPAIN AND PEPSIN COMPARED.

As a result of some experiments with papain and pepsin, as to their solvent and peptonizing action on egg albumin, DOTT (*Pharmaceutical Journal and Transactions*, March 10, 1894) notes the following:

1. One hundred grains of albumin, freshly boiled and sifted, digested in one ounce of water, with ten minims of dilute hydrochloric acid, at a temperature of 98° to 100° F., with two grains of pepsin. Solution was nearly complete in an hour. After four hours, one drachm of nitric acid, diluted with three drachms of water, was added; the precipitate, collected, washed, pressed gently in blotting-paper, and weighed in the moist state, equalled ten grains.

2. The same experiment in all respects, except that seven grains of papain were used. The nitric acid precipitate (including undissolved albumin) equalled one hundred and three grains.

3. One hundred grains of egg albumin, with one ounce of water, fifteen minims of dilute hydrochloric acid, digested at 130° F., with two grains of pepsin. Solution was nearly complete in fifteen minutes. After two and a half hours the practically clear solution was mixed with thirty minims of nitric acid, diluted with two drachms of water. The precipitate, collected and weighed, as above noted, equalled two and a half grains.

4. The same experiment in all respects, except that two grains of papain were used.

After two and a half hours the albumin was not nearly dissolved. It was collected and weighed in the moist state, equalling seventy grains. The filtrate from this precipitate was then mixed with nitric acid, as above described; precipitate collected, etc., equalled thirty-three grains.

From these experiments it is evident that papain has only a slight solvent action on albumin at the temperature of the body, and practically no peptonizing action. On the other hand, pepsin has a high power both of dissolving albumin and peptonizing the solutions. The higher temperature of 130° F. (as in the British Pharmacopœia's test for pepsin) increased the rapidity both of the solvent and peptonizing power of pepsin, and likewise increases the solvent power of the papain.

Certain assumptions are made: first, that the pepsin and papain of two well-known makers are what they are represented to be; second, that non-precipitation by nitric acid is a trustworthy indication of the formation of peptone.

PRESCRIPTIONS.

Useful in painful dyspepsia:

℞ Bismuthi subnitrat., gr. x;
Magnes. carbonat., gr. xv;
Liq. potassæ, ♏x;
Acid. hydrocyan., dil., ♏iii;
Tinct. zingiberis, ♏v;
Aq. menth. pip., q. s. ad ƒ℥i. M.

For one dose. To be repeated two or three times daily. Shake well.

A cardiac stimulant:

℞ Tinct. strophanthi, ♏xl;
Tinct. zingiberis, ℥i;
Syr. simplicis, ℥iss;
Aquæ chloroformi, q. s. ad ƒ℥viii. M.
2 tablespoonfuls three times a day.

An application for eczema:

℞ Ol. amygdalæ dulc.,
Glycerini, of each, ƒ℥iii;
Zinci oxidi, ℥iss. M.

A good nutrient enema:

℞ Egg, one;
Fresh milk, ℥iv;
Pancreatic solution, ℥ii;
Sodium bicarbonate, gr. xx;
Hot water, ℥ii.

Switch the egg and milk thoroughly together, add the pancreatic solution and bicarbonate of sodium, then the hot water, and let stand in a warm place for half an hour. A little brandy or wine may be added, if desired. The addition of a few drops of laudanum frequently assists in the retention of the enema.

Caustic for nævi, tuberculous growths, etc.:

℞ Sodii ethylatis, ℥i;
Alcohol, ƒ℥i. M.
Apply with care.

The following will be found useful in promoting the contraction of fistulous tracts:

℞ Camphoræ, ℥i;
Salolis, ℥ss;
Etheris, ƒ℥i. M.

For uterine hemorrhage:

℞ Ext. cannabis indicæ fl., ♏viii;
Ext. ergotæ fl., ƒ℥i;
Ext. hamamelis fl., ƒ℥ss;
Tinct. cinnamomi, ƒ℥ss;
Aq., ad ƒ℥iii. M.
2 tablespoonfuls every three hours.

—*Medical Press and Circular*, March 7, 1894.

PRESCRIPTIONS AND PRACTICAL NOTES.

Alopecia:

Oil of cinnamon, ℥iiss;
Sulphuric ether, ℥i.
Paint twice a day.

Acute tonsillitis:

Crystallized carbolic acid,
Camphor, of each, gr. xv;
Dist. water,
Glycerin, of each, ℥ii.
Paint on the tonsils.

Anæsthetic, local:

Chloroform, ℥i;
Ether, ℥vi;
Menthol, gr. xxx.
To be applied by a spray.

Benzonaphthol.—In bowel- and stomach-troubles of children this substance should be exhibited five times a day, according to the following total daily dosage:

Age.	Grains.
0 to 6 months	3 to 7½
7 to 12 months	9 to 12
1 to 3 years	13
4 to 7 years	22½
8 to 14 years	30

Tuberculous bronchitis:

Creosote, ℥ss;
Tinct. of cinchona, ℥i;
Pure chloroform, ℥ss;
Malaga wine, q. s. ad. ƒ℥iv.
A teaspoonful three times a day before meals.

Burns:

Olive oil, ℥ii;
Salol, ℥iii;
Lime-water, ℥ii.

Conjunctivitis (granular):

Mercuric oxide, gr. iii;
Zinc oxide,
Thymol,
Muriate of cocaine, of each, gr. iss;
Camphor, gr. ss;
Vaseline, ℥i.

Erysipelas.—Dr. H. Koster covers the affected part and its immediate neighborhood with a moderately thick layer of vaseline, over which is placed a piece of linen and a gauze binder. The dressing is applied twice a day.

Emmenagogue:

Oxalic acid, gr. xx;
Glycerin, ℥iss;
Syrup of orange-flowers, f℥ii;
Distill. water enough to make f℥xii.
Dose.—2 ounces every hour.

Gonorrhœa:

Antipyrin, gr. xxx;
Corrosive sublimate, gr. ss;
Water to make f℥viii.
Injection.

Gonorrhœa (chronic):

Tannin,
Iodoform, of each, gr. xxx;
Glycerin, ℥i;
Rose-water, ℥iv.
Injection.

Hæmoptysis:

Gallic acid,
Ergotin, of each, gr. xv;
Distilled water,
Syrup of marshmallow, of each, ℥i.
Dose.—1 ounce every two hours.

Hemorrhoids.—(*a*) Ointments:

1. Cold cream, ℥ss;
Tannin, gr. xxx;
Extract of opium, gr. iii.

2. Lard, ℥i;
Goulard's cerate, ʒii;
Antipyrin, gr. xlv;
Extract of belladonna,
Extract of opium, of each, gr. xv.

3. Cacao-butter, ʒiii;
Milk of almonds, ʒii;
Extract of hamamelis, gr. iii.

4. Vaseline, ℥i;
Tannin, gr. xx;
Muriate of cocaine, gr. xv;
Sulphate of morphine, gr. iv;
Sulphate of atropine, gr. iii.

5. Aristol, gr. xxx;
Balsam of Peru, ʒi;
Simple ointment, ℥i.

(*b*) Suppositories:

1. Aristol, ʒi;
Extract of opium, gr. ii;
Extract of belladonna, gr. ii;
Muriate of quinine, gr. xv;
Cacao butter,
White wax, of each, a sufficiency to make six suppositories.

2. Lard, gr. xxx;
Extract of hyoscyamus,
Extract of conium, of each, gr. ii;
Cacao butter, a sufficiency for one suppository.

3. Chrysarobin, gr. i;
Iodoform, gr. iii;
Extract of belladonna, gr. $\frac{1}{10}$;
Cacao butter, a sufficiency for one suppository.

Iodoform powder (antiseptic and non-irritant):

Powdered iodoform, ℥ii;
Salicylic acid (powdered),
Subnitrate of bismuth, of each, ʒvi;
Camphor, ʒiss.

Megrim:

Phenacetin, gr. xlv;
Caffein sodio-salicylate, gr. iii;
Muriate of quinine, gr. x;
Saccharin, gr. ½.
Divide into ten powders.
Dose.—1 powder every two hours.

Tænia:

Chloroform, ʒi;
Croton oil, gtt. i;
Glycerin, ℥i.
For one dose.

Sickness (pregnancy):

1. Bromide of strontium, gr. xx.
Twice a day before meals.

2. Menthol, gr. xv;
Alcohol,
Simple syrup, of each, ℥i.
A teaspoonful every hour.

Sweats (night-, in phthisis):

Salicylic acid, ʒss;
Distilled water, ʒiiss;
Alcohol, ʒiss;
Glycerin, ʒi.
Dose.—30 minims subcutaneously for four or five consecutive evenings.

Ulcers (syphilitic):

Calomel,
Oxide of zinc, of each, gr. xv;
Vaseline, ℥vi.

—*Provincial Medical Journal*, March 1, 1894.

PRESCRIPTIONS.

For chronic lead-poisoning:

℞ Magnesii sulphatis, ℥ss;
Potassii iodidi, ʒi;
Sodii sulphatis, ʒii;
Syrupi aurantii, f℥ss;
Aquæ menthæ piperitæ, q. s. ad f℥viii.
Misce et fiat mistura.
2 tablespoonfuls three times daily.

For the green diarrhœa of infants:

℞ Acidi lactici diluti, ♏iv;
Tincturæ limonis, ♏i;
Syrupi simplicis,
Aquæ, of each, ℥ii. M.
A teaspoonful thrice daily after suckling.

A confection for gonorrhœa:

℞ Potassii bicarbonatis,
Potassii nitratis, of each, gr. v;
Pulveris cubebæ, gr. xxx;
Olei santali, ♏xx.
Fiat confectio.

A gargle for simple tonsillitis:

℞ Sodii biboratis, ʒiss;
Tincturæ benzoini, ʒiiss;
Aquæ rosæ, q. s. ad ℥viii.
Fiat gargarisma.
To be used frequently.

For commencing infantile broncho-pneumonia:

℞ Ammonii acetatis, gr. viiss;
Tincturæ aconiti, ♏xv;
Syrupi codeinæ (Pharm. Gall.), ʒii;
Aquæ, ad ℥ii.
Fiat mistura.
A teaspoonful hourly till the dyspnœa is relieved.

—*Practitioner*, April, 1894.

PRESCRIPTIONS.

Local dressings for burns:

1. ℞ Cocainæ hydrochlor., 1 part;
Acid. carbolici, 2 parts;
Acid. borici, 10 parts;
Glycerini, 17 parts;
Aq. destill., 70 parts. M.

2. ℞ Acid. borici, 4 parts;
Iodoformi, 2 parts. M.

3. ℞ Acid. borici, 3 parts;
Iodoformi, 2 parts;
Aristol, 1 part. M.

For laryngismus stridulus:

℞ Chloral. hydratis, ʒss;
Pot. bromidi, ʒii;
Syr. tolutani, ℥iss. M.
A teaspoonful every half-hour.

Useful in general infantile eczema:

℞ Hydrarg. ammoniati, gr. x;
Acid. carbolici, gr. viii;
Ol. olivæ, ʒss;
Ung. petrolei,
Ung. zinci oxidi, of each, ℥ss. M.
Apply two or three times daily.

For cancer of the cervix uteri:

℞ Iodoformi, gr. xv;
Extracti opii, gr. viii;
Essentiæ bergamottæ, ♏x.
Ol. theobrom., ʒiiss. M.
To make twelve suppositories; 1 to be introduced into the vagina when necessary.

For alopecia:

℞ Quininæ sulphatis, gr. xl;
Tinct. cantharidis, ʒi;
Sp. ammon. aromatici, ℥i;
Ol. ricini, ℥iss;
Ol. rosmarini, ♏vii;
Sp. vini rect., ℥v.
Shake well before applying once a day.

Chlorosis from menorrhagia:

℞ Sulphate of iron, gr. c;
Ext. hydrastis canadensis, gr. c;
Ext. hyoscyamus, gr. l.
Divide into one hundred pills; 2 to be taken at each meal.

—*Medical Press and Circular*, April 18, 1894.

APHRODISIAC TREATMENT IN WOMEN.

LUTAUD points out in the *Journal de Médecine de Paris* for March 18, 1894, that patients frequently present themselves needing stimulant sexual treatment. Aside from general hygienic recommendations, the following methods may be carried out:

℞ Extract of nux vomica,
Extract of cannabis indica, of each, gr. xv;
Aqueous extract of aloes, gr. iii.
Make into fifty pills; take 1 after meals.

If phosphorus is indicated, the following may be used:

℞ Phosphorus, gr. ss;
Bisulphide of carbon, gtt. xx;
Sweet oil of almonds, ʒvi;
Magnesia, a sufficient quantity.
Make into fifty pills and coat with gelatin; 1 or 2 may be taken with meals.

Small doses of opium, say ¼ grain of the extract, one hour before retiring at night, are sometimes recommended. In other instances, unless there is danger of producing the habit, cocaine may be employed. Where the trouble

lies in hyperæsthesia, local treatment may be necessary, either operative or anæsthetic. In many instances hydrotherapy is exceedingly useful.

In the way of diet, fish, shell-fish, condiments and vanilla, and similar substances are useful. Electricity is of comparatively little value.

THE TREATMENT OF TYPHOID FEVER IN CHILDREN.

In the *Journal de Médecine de Paris* for March 18, 1894, there was an article upon this subject, in which the following treatment is recommended. At the onset of the attack, when the diagnosis is still uncertain and resembles in some respects the fever due to gastric disorder, it is well to administer small doses of calomel with a little milk sugar, and to give a rectal injection of an infusion of chamomile in boiled water, with four per cent. of boric acid, morning and night. Internally, to give from a coffee- to a dessertspoonful every two hours of the following prescription:

℞ Benzonaphthol, gr. xiii to gr. xxx;
Syrup of peppermint, ℥i;
Syrup, ℥iv.

In the way of nourishment, the patient may be given every two hours a very small cup of milk, to which may be added as a stimulant a little coffee, tea, cognac, or a very slight flavoring with vanilla or chocolate. In cases where the diagnosis is thoroughly assured after the calomel has acted, it is well to prescribe citrate of magnesium to move the bowels and large rectal injections morning and night of a borated solution already named; or,

℞ Naphthol, gr. iii;
Boiled water, Oii.
To be used in four equal quantities.

Internally, an antiseptic dose, composed as follows, is useful:

℞ Benzonaphthol, gr. xv to gr. xxx;
Salicylate of magnesium, ʒss to ʒi;
Syrup of peppermint, ʒvi.
Simple syrup, ℥iv.

If there is a bitter taste, it is well to replace the salicylate of magnesium by the salicylate of bismuth. Of this mixture, give a teaspoonful every two hours, and morning and night administer a capsule or cachet containing 2 to 4 grains of the hydrochlorate of quinine, or else give the same dose by injection or suppositories. If the headache is severe, replace the quinine by antipyrin; spongings with tepid water may be resorted to, and care should be taken, by the use of a boric-acid mouth-wash, to keep the mouth clean. If the fever is of great intensity, the same treatment, with the addition of constant spongings with cooler water, is to be followed, and should the nervous disturbance be very great, small doses of coffee or of chloral may be used, but antipyrin is not to be employed. In grave cases the baths are given even more frequently, as often as is necessary to keep the temperature down. For the nervous agitation the following mixture may be prescribed:

℞ Hydrate of chloral, gr. vi to gr. xv;
Tincture of musk, gtt. xx to gtt. xl;
Syrup of orange, ʒi;
Water, ℥iii.

Cold compresses are to be applied to the head, if there is delirium. In cases showing marked adynamia, the cold should be applied to the head and the following mixture given:

℞ Hoffmann's anodyne, gtt. x to gtt. xv;
Malaga wine, ℥i;
Syrup of mint, ℥i;
Water, ℥iii.
A teaspoonful to a tablespoonful every hour.

In cases of typhoid fever in which there seems to be great cardiac depression, the pulse being feeble and showing evidences of collapse, it is well to use the following injection hypodermically morning and night:

℞ Caffeine, gr. xxx;
Benzoate of sodium, gr. xlv;
Distilled water, enough to make ℥i.
10 to 20 minims of this may be used.

Where complications such as bronchitis, broncho-pneumonia, etc., arise, the same treatment is to be continued as that just given, but the cold spongings are to be stopped and a cotton jacket is to be applied to the chest. Morning and night a mustard sinapism should be applied to the chest and the stimulating treatment already indicated employed.

During the period of convalescence the baths are diminished as the temperature approaches the normal. Soups, broths, and thoroughly softly cooked meats and pulpy vegetables are allowed, and the following tonic mixture given in the dose of a dessertspoonful three times a day:

℞ Tincture of gentian,
Tincture of cinchona, of each, ℥v;
Fluid extract of kola, ɱlxxv.

Champagne also is sometimes useful if it agrees with the patient. Should hemorrhage from the intestine complicate the case, absolute

rest, with local application of cold, is to be resorted to. Small doses of opium may be administered by the mouth, and every two to three hours 2 or 3 drops of perchloride of iron are to be employed. Ice compresses should be applied over the belly. Where there is danger of sloughs and abscesses, it is well to wash the part with a four-per-cent. solution of boric acid, and afterwards apply iodoform or salol. Abscesses, of course, should be opened, drained, and irrigated with mild antiseptic solutions. For the prophylaxis of typhoid fever, the discharges of the patient should be received in a five-per-cent. solution of sulphate of copper or in a 1 to 1000 solution of bichloride of mercury. The milk which is taken by the patient should be carefully sterilized, and after the case recovers careful disinfection of all the vessels used by the patient should be carried out.

WARM BATHS.

The *Medical Press and Circular*, April 25, 1894, states that WICK read a paper on the effects of warm baths on the temperature. He said the specific heat of the body was reduced when the bath was between 31° and 34° C., but the reduction was not parallel with the time or temperature of the bath. The pulse was increased when the temperature of the bath rose to 37° C., but was unaffected between 34.8° and 36.4° C. The specific heat is increased during the first half-hour, but gradually becomes less thereafter. The amount of direct heat depends a good deal on the conductivity of the tissues, as proved by experiments on the dead body, which shows that the heating is in the ratio of geometrical progression. The true heating agent in the body is through the circulation.

There are other factors, as radiation, conduction, and evaporation, which he maintains to be most important, as in breathing, perspiration, etc. The latter is adapted for the packing treatment as the perspiration is abstracted from the blood. All these conditions must be accepted as arbitrary, as the body will soon accommodate itself to the treatment by warm baths, and fail to act either by evaporation, radiation, or conduction.

It may be approximately stated that the pulse is increased ten beats per minute by increasing the temperature to 40° C., while the skin is greatly reddened.

Another point of investigation was the effect on the metabolism of the body. The body-weight begins to decrease after commencing the warm-water treatment, falling 350 to 500 grammes; after which it begins to increase if treatment be continued, till the body has reached 500 to 600 grammes more than it weighed at the commencement. The loss is greatest at the commencement of the treatment, and is more rapid than the increase. The nervous system is in no way irritated by the treatment. The quality of the pulse, measured by the sphygmograph, shows no weakening of the arteries, as is generally assumed, the hæmoglobin is increased, the blood is not subsequently thickened, the leucocytes are increased, the breathing is longer and deeper, and the sensation of the skin is soon restored.

TREATMENT OF TRAUMATIC EPILEPSY.

DARBY, in the *Virginia Medical Monthly* for May, 1894, states that the only remedies to be relied on in the treatment of traumatic epilepsy is the trephine in depressed fractures and the scalpel in other traumatisms which may produce reflex irritation of this character, and when the bone is removed in fractures, the dura should be opened, and if the cortex of the brain shows signs of injury, it should be carefully cut away and the wound stitched with catgut and closed antiseptically. When the bone is not cut away in small bits, it may be replaced in the opening and expected to cause no trouble, provided the button is not thicker than the surrounding bone. Prevention is better than cure, and it should be the purpose of the surgeon to prevent these phenomena by operation in all cases of depressed fracture as soon as he sees them, as the operation is more simple at that time, and if a button of bone has to be removed, he can usually select the locality for his trephine, and thus keep away from dangerous areas, such as the meningeal arteries and sinuses, as well as preventing strong adhesions of the dura and the development of epilepsy. After surgical operations for this disease, the patient should be kept on medical treatment for at least two years to prevent a return of the trouble. It is in this class of cases that we may reasonably expect good results. Bromide of potassium, in full doses, has given the best results, but of late a solution of bromide of gold and arsenic, given in 5- to 10-drop doses, has given very satisfactory results. The patient should, if possible, be induced to live a temperate and systematic life, sleeping regularly, eating moderately, and keeping his digestive and excretory organs in a healthy condition. Especially is it necessary for him to abstain from the excessive use of tobacco and alcoholic stimulants.

OPHTHALMIA NEONATORUM.

AUGUSTUS P. CLARKE (*Journal of the American Medical Association*, April 28, 1894) considers one of the most important indications in the treatment of ophthalmia neonatorum the removal, at short but regular intervals, of the purulent secretion, either by syringing or by prolonged irrigation through some of the well-recognized varieties of irrigators. Great care should be taken that no violence is done to the epithelium or to the soft structures.

Various solutions are discussed, and, in addition to the regulation treatment, he has occasionally found benefit from the following prescription:

Bichloride of mercury, gr. i;
Ammonium chloride, gr. vi;
Water, ℥xvi.

In his experience he has occasionally had good results with mild chloride of mercury dusted between the eyelids after the eyes have been cleansed. He has also used iodoform in the same way. Panas's solution is likewise recommended, according to the following formula:

Biniodide of mercury, 1 part;
Absolute alcohol, 400 parts;
Distilled water, resterilized, 20,000 parts.

THE DISINFECTION OF THE CONJUNCTIVAL CUL-DE-SAC.

LAGRANGE (abstract in the *Annales d'Oculistique*, March, 1894, p. 237) thinks that, before opening the anterior chamber, it is absolutely necessary that the conjunctiva, and especially the superior cul-de-sac, should be thoroughly cleansed. In order to accomplish this, he has had the handle of a Desmarres elevator hollowed, to the upper part of which is attached an india-rubber tube, which is, in turn, in connection with a receiver containing an antiseptic liquid. In raising the receiver the liquid runs through the handle and through several holes at the outlet. He passes about a litre of sublimate solution (1 to 4000) into the eye which is to be operated upon. This irrigation is of great service in the treatment of purulent ophthalmia, where it not only dislodges the pus, but lessens the virulence of the cocci.

OPHTHALMIA NEONATORUM.

HIRAM WOODS (*Annals of Ophthalmology and Otology*, April, 1894) discusses certain causes of failure in the treatment of ophthalmia neonatorum, one of which he believes is rough handling of the affected eyes, especially by ignorant attendants. He calls attention to the fact that nitrate of silver is often injudiciously and wrongly used, and is responsible for opacity of the cornea. According to Dr. Woods, the clinical condition demanding the non-use or discontinuance of silver is conjunctival purulency, unaccompanied by swelling or tension of the lids characteristic of infiltration, and without papillary swelling of the conjunctiva, or much of it, on the upper lid, and the deep-red color seen in the conjunctiva in severe cases. He insists upon the fact that mere purulency of the conjunctiva does not necessarily demand nitrate of silver, but that the appearances of the lids and conjunctiva must decide its use. He very properly protests against the practice of instilling cocaine to relieve the pain of ophthalmia neonatorum.

IRIDECTOMY IN THE TREATMENT OF ULCERS AND ABSCESSES OF THE CORNEA.

BETTREMIUX (abstract in the *Annales d'Oculistique*, March, 1894) believes that there is no more effectual means of arresting the alarming progress of certain ulcers or abscesses of the cornea which have resisted every medical remedy, than iridectomy. He considers the dangers of panophthalmitis after the operation as insignificant. The anterior chamber in some cases must be again evacuated after the completion of the iridectomy.

SKIN-GRAFTING AS A THERAPEUTIC AGENT IN MALIGNANT GROWTHS.

DR. F. B. TIFFANY (*Ophthalmic Record*, April, 1894) recommends skin-grafting after the removal of malignant growths of the eyelids and orbits, the grafts being taken from a remote part of the body of the patient himself. His method is as follows: after thorough antiseptic preparation, both of the area of operation and of the portion of the body from which the graft is to be taken, the malignant growth is removed, its bed or seat is measured, and a corresponding measurement is outlined upon the arm or chest. The graft is then cut about one-third larger than the dimensions of the cavity to be filled. It is transferred, without handling, immediately to its new abode, where it is fixed in position by a few stitches of delicate silk. The parts are covered by antiseptic gauze and isinglass plaster; collodion and iodoform are never used. The parts are dressed daily, but the grafts are not specially examined for seven or eight days.

INTRAOCULAR THERAPEUTICS: AN EXPERIMENTAL STUDY.

HENRY M. CHASSEAUD (*Journal of Pathology and Bacteriology*, November, 1893, and the *Ophthalmic Review*, January, 1894) has performed a number of experiments to ascertain the value of intraocular injections. He concludes from his experiments:

1. That various fluids may be introduced with safety into the posterior chamber of the eye.

2. That chlorine-water is the only substance which fulfils the necessary conditions for a useful intraocular antiseptic. Its action is efficient, and it causes apparently no inflammatory reaction.

3. In regard to the other antiseptics tested, corrosive sublimate and carbolic acid, owing to their stable compounds with albumin and the inflammatory reaction which they produce, are not so useful as some others which are less active. Tincture of iodine, camphorated naphthol, hydronaphthol, eucalyptol, and other antiseptic oils are far too violent in their action and cause disorganization of the eye. Boric acid and iodoform are weak and non-irritant antiseptics. Oxycyanide of mercury and peroxide of hydrogen are just as good antiseptics as chlorine, but the former causes opacities in the vitreous and the latter seems to bleach the pigment of the eye. Creolin is a powerful irritant, and its antiseptic action is very doubtful. Pyoktanin does not act as an antiseptic in the vitreous; it gives rise to neuritis, with subsequent degeneration and atrophy of the optic nerve.

4. The idea of causing a localized adhesion of the retina to the choroid by inducing a moderate degree of inflammation in the former has not been very successful in practice. Slight degrees of retinitis can easily be produced; they are usually accompanied by a subretinal effusion. When this effusion becomes absorbed, adhesion between the retina and choroid never ensues in rabbits. In severe forms of retinitis caused by powerful irritants, we certainly get adhesion of the retina to the choroid, but with complete disorganization of the former, extending for a considerable distance from the point of injection.

5. In all forms of inflammation of the retina the nerve-cell layer is the first affected and suffers most. The external granule layer is the last to disappear. None of the seven layers are ever reproduced when once they have been destroyed.

6. Although the *staphylococcus pyogenes aureus* was injected into the vitreous over fifty times, in no case did sympathetic inflammation affect the opposite eye, so long as the latter had not been the seat of a recent inflammation or had not been injured subsequently.

7. It must be borne in mind that all these experiments were performed on rabbits. In these animals the regeneration of the vitreous is wonderfully rapid, and persistent glaucoma, leading to disorganization of the eye, seldom, if ever, occurs. How far these results may be applicable to man it would be difficult to say.

THE EFFECT OF SCOPOLAMINE ON THE EYE.

LOBASSOW (*Revue Générale d'Ophthalmologie*, March, 1894), after a series of experiments on men and rabbits, comes to the following conclusions in regard to the action of scopolamine on the eye:

1. It dilates the pupil more quickly and powerfully than atropine, and paralyzes the accommodation, the effect being less lasting than that of atropine.

2. Its use causes no complications.

3. In spasm of the accommodation scopolamine acts more powerfully than atropine.

4. It is absorbed more quickly into the anterior chamber than atropine.

5. When applied locally or in subcutaneous injections, scopolamine favors the absorption of other substances into the anterior chamber.

6. Scopolamine increases the intraocular pressure in eyes predisposed to glaucoma.

7. The antiphlogistic effect of scopolamine is less than that of atropine.

8. In cases of idiosyncrasy, scopolamine is preferable to atropine.

THE VALUE OF WEAK LENSES.

The relation of weak lenses for the relief of asthenopia and other complaints is thus referred to in an editorial in the *Philadelphia Polyclinic*, May 5, 1894:

This is just now being discussed among the ophthalmologists, some of them claiming that they have a positive value in preventing eye-strain, while others believe that they only act by producing a mental impression.

The fact probably is that for many persons lenses of .50 D. spherical or less, or .25 D. cylindrical, produce no appreciable improvement of vision or freedom from strain. But the question of the necessity or value of lenses must always be influenced by the individuality of the patient; and there are persons to whom

the relief afforded by such lenses is positive and unmistakable, and it may be much greater than the relief that would be given to other persons by lenses of greater strength.

Hotz, of Chicago, has reported fifty cases in which such lenses were used after other remedies had failed to give relief. He found that the treatment was reported to have been successful in sixty per cent. of the cases. But one patient reported a negative result, and the others had not been heard from.

THE TREATMENT OF CHRONIC SUPPURATIVE OTITIS MEDIA.

BACON (*New York Eye and Ear Infirmary Reports*) says the usual treatment employed in the simple, uncomplicated cases is syringing the ear with warm water once or several times a day, according to the quantity and character of the discharge, and the instillation of the following drops:

℞ Zinci sulph., gr. ii to gr. iv;
Acid boracic, gr. x;
Aq. destil., ℥i. M.

Other drops used were those containing sulphate of copper or acetate of lead, which should be used when the discharge is not checked by sulphate of zinc.

When small granulations are present, these should be cauterized with nitrate of silver or chromic acid fused on the end of a probe, but when they are of large size or associated with caries, they should be thoroughly removed with Blake's snare or with curettes.

For small polypi or granulations the so-called alcohol treatment, consisting in the instillation of alcohol and boracic acid (20 grains to 1 fluidounce), is very successful in some instances, while in the treatment of granulations arising from carious walls he has met with marked success in the use of alcohol and iodoform (20 grains to 1 fluidounce). With some patients it will be necessary to dilute the alcohol one-half with water, as they otherwise complain of pain after the instillation of the drops. —*Philadelphia Polyclinic*, May 5, 1894.

TREATMENT OF URETHRAL CARUNCLES.

LEILL (*American Journal of Obstetrics*, April, 1894) treats urethral caruncles by the use of torsion or excision. The former operation presents the advantage of giving rise to a slight hemorrhage; the latter operation gives most assurance against a recurrence, and hemorrhage is easily checked by a temporary tamponing of the urethral canal with a conical plug of styptic cotton.

LIGATION OF UTERINE ARTERIES FOR MYOMATA.

ROBINSON (*American Journal of Obstetrics*, April, 1894) has treated four cases of uterine myoma by ligation of the uterine arteries; neither the tubes nor ovaries were removed. This operation avoids the shock attendant upon hysterectomy; and since the ligature includes many nerves and cuts off communication with the automatic menstruation ganglion, immediate cessation of menstruation results. The operation is followed by steady atrophy.

PORRO'S OPERATION FOR OSTEOMALACIA, WITH A NEW AFTER-TREATMENT.

SEELIGMANN (*American Journal of Obstetrics*, April, 1894) treated a severe case of osteomalacia by Porro's operation; the stump of the uterus was dealt with extraperitoneally. The patient made an uninterrupted recovery. While the bones were still soft extension was applied. This was begun six days after the operation and continued for eight weeks. The patient was placed upon a water-bed and counter-traction applied from above. Weights were gradually increased until ten pounds were used. As a result of this the pain soon disappeared, the body became seven inches longer, and the configuration of the pelvis was favorably affected. The kyphoscoliosis dextrans disappeared. Thus, after seven years of bedridden life, with the most severe pains and deformities, the patient regained the power of walking, and at the time of reporting was capable of performing her household duties.

TREATMENT OF PUNCTURED WOUNDS OF THE BRAIN.

BERGER (*La Tribune Médicale*, March 29, 1894), discussing the subject of trephining for punctured wounds of the brain, states that the first treatment should be absolute rest, and that surgical intervention should only be practised when there are distinctly localizing symptoms.

VERNEUIL also declared in favor of expectation, and mentioned four cases of penetrating gunshot wounds without mortality, none having been subject to any surgical intervention. In

one case where an effort was made to search for the bullet, the latter was found some two or or three inches away from the track taken by the probe.

Pozzi reported the case of a girl who, fifteen days after a gunshot wound of the temporal region, complained of almost unbearable hemicrania. There was a small wound from which pus was discharging. This wound was enlarged by the trephine and was drained, the patient recovering.

Ollier saw a man who had received a bullet in the ear. He recovered with facial palsy and hemiplegia. Some months later he suffered from pain distinctly limited to the posterior parietal region. He was trephined, but nothing was found. Some months later he died, and at the autopsy the ball was found behind the pharynx.

TREATMENT OF INGUINAL ADENITIS.

Brault (*Lyon Médical*, No. 10, 1894) closes an elaborate paper upon the treatment of inguinal adenitis with the statement that incision should be the method of choice in cases of acute adenitis which complicate syphilis and gonorrhœa. Chancroidal buboes should be punctured, evacuated, and injected with nitrate-of-silver solution (five per cent.).

In acute tubercular adenitis all the infected glands should be excised at once.

COCAINE-POISONING.

Réclus (*La Tribune Médicale*, March 29, 1894) reports a case of cocaine-poisoning which occurred in the practice of a colleague from urethral injection of the drug. The patient was seventy-two years old, and had retention of urine from enlarged prostate, for the relief of which hypogastric puncture was necessary. Repeated attempts at catheterization were necessary, and finally there was injected into the urethra five drachms of a five-per cent. solution of cocaine. Scarcely was the injection made when the patient became extremely pale, was seized with trembling, and died in a few minutes.

Réclus, in commenting upon the case, placed the whole blame on the doctor who administered a toxic dose. He holds that solutions stronger than two per cent. should not be used, and the quantity employed should always be extremely limited.

Bazy stated that since it is impossible to inject five drachms into the urethra, a portion of the solution must have passed into the bladder and been absorbed from this viscus, while Sée advanced the very plausible theory that the solution had probably been forced into false passages.

TREATMENT OF TUBERCULAR JOINTS BY PASSIVE HYPERÆMIA.

Mikulicz (*Centralblatt f. Chirurgie*, No. 12, 1894) contributes in full a number of cases treated by Bier's method of passive congestion. In some the results were satisfactory, in others the patients were not improved or even grew worse. Therefore, the author of this paper holds that the passive hyperæmia treatment is, like all other measures, applicable only to certain patients. In some the virulence of the micro-organism infection is such as to overwhelm the tissues in spite of all help. In others the tissue-resistance is sufficiently strong to bring about cure without any help. As to the third class, where the destructive action is about equalled by the normal tissue-resistance, this method may, by increasing local nutrition, bring the disease to a favorable ending.

Since it is impossible to note beforehand what the effect of the treatment will be, Mikulicz holds that in each case the patient should be carefully observed for from eight to fourteen days from the beginning of the passive hyperæmia. If during this time the symptoms increase in severity, the treatment should be abandoned. If, however, the pain grows less, there is encouragement to go on. In one case, treated continuously for many weeks but not under careful medical surveillance, atrophy of the muscles of the arm occurred. Mikulicz now combines this method with iodoform injection.

(For details of Bier's method, see Therapeutic Gazette, January 16, 1893.

TREATMENT OF APPENDICITIS.

Swain (*Medico-Chirurgical Journal*, March, 1894) holds that, since about ninety per cent. of cases of appendicitis recover spontaneously, early operative interference in nearly every form of appendicitis is not justifiable. Cases of simple and plastic appendicitis are to be treated by rest in bed, moderate amount of liquid diet, purgatives, rectal injection if necessary, local application of leeches or fomentations, and hypodermics of morphine for the relief of pain. As soon as pus is present operation is indicated. This may be performed

during the first week, but is more commonly required during the second. When in doubt as to the presence of pus, there is usually no great harm in delaying operation. If, however, the symptoms are steadily growing worse and the pulse becoming rapid, operation is indicated.

Section, then, is called for in suppurative cases, in cases where there is good ground for suspecting deep suppuration, and also in the relapsing and rapidly-perforating cases. The best incision is the oblique one, placed at right angles to an imaginary line drawn from the right superior iliac spine to the umbilicus. This should be from two to four inches long, and should be placed about two or three inches internal to the iliac spine. In suppurative cases the incision should be placed over the seat of suppuration, since thus there is less risk of opening the peritoneal cavity. The appendix should be removed in suppurative cases only when this operation is readily effected without opening the general cavity. The risk of fæcal fistula is lessened by suturing the muscular and mucous walls of the stump of the appendix and then invaginating this into the cæcum and stitching the peritoneum over it.

HARSANT, in commenting on this paper, states that he has had two patients under observation, one of whom had four attacks, the other three. Both have now been free from trouble for several years, having apparently recovered without operation.

LOW pointed out that post-mortem appearances offered insuperable objections to the theory that a foreign body caused the disease, and compared the appendix to the tonsil.

MITCHELL CLARKE held that the pulse and temperature were the best indices as to the need of operation. If, after first yielding to treatment, the pulse became more rapid and the temperature higher, this would indicate that operation is required. He reported the case of a boy in whom perforation into the general abdominal cavity had presumably taken place two days before he was seen, and whose abdomen contained free pus and gas. This boy recovered after operation by Bush, who simply opened and washed out the peritoneal cavity, and a few days later performed a second operation, removing the appendix.

NEWNHAM deprecated operative interference in all cases of appendicitis, and said that, although he had seen an enormous number of such cases, he had never known one to result fatally, nor any in which operation was necessary.

THE USE OF ICHTHYOL IN GYNÆCOLOGY.

POLACCO (abstracted in *American Journal of Obstetrics*, April, 1894) reports nine hundred and seventy-two gynæcological cases cured by himself and colleagues by the use of ichthyol, these including eczema of the vulva, pruritus, vaginitis, vaginal cicatrices, erosions of the cervix, ectropion, hypertrophy of cervix, multiple lacerations of cervix, deep lacerations of cervix, cervical endometritis, subinvolutions, and indeed all the known gynæcological affections.

Eczema and pruritus were cured almost at once. In vaginitis the results were most prompt and gratifying, the ichthyol being applied on tampons in antiseptic glycerin solutions. For endometritis ichthyol is used in ten- to twenty-per-cent. solution, and not only cures for the time, but prevents a return of the trouble. The drug was tried in some cases of metritis and parametritis; not more than 11½ grains were rubbed into the skin by means of a ten-per-cent. ointment, and it was also applied to the vagina by means of tampons impregnated with the glycerin solution. After three or four days of this treatment, combined with rest in bed and the mild use of saline purgatives, convalescence set in promptly.

The drug is absorbed, is comparatively cheap, since it is used in ten-per-cent. or at most twenty-per-cent. solution, does not permanently stain the clothing, has an odor which is easily disguised by volatile oils, and, unless used in conjunction with lanoline, never irritates the skin. Polacco concludes with the statement that ichthyol is the most potent analgesic known and adopted in gynæcological therapeutics of the day. It has a decided absorptive action upon exudations, manifested more rapidly when used in the early stage of the disease.

ALBERTOLETTI in the main agrees with the report just quoted, with the exception that he holds that ichthyol does not cause the absorption of exudation.

COLOMBINI states that cotton soaked in five- or ten-per-cent. solution of the sulph-ichthyolate of ammonia in glycerin causes speedy disappearance of acute vulvitis with painful erosions. In vaginitis tampons impregnated with this solution are equally efficient. In urethritis a five- to ten-per-cent. solution of ichthyol in water, when injected, caused prompt subsidence of symptoms. Cervical endometritis with ulcers was quickly cured in from six to eight treatments with tampons soaked in ten-per-cent. ichthyolate in glycerin, while the same solution, carried in by means of gauze wrapped around the body of a Playfair sound,

cured endometritis of the body of the uterus. Where the cervix was insufficiently dilated to allow of this procedure, intrauterine injections were made by means of a Bozeman double recurrent catheter.

ANTISEPTIC POWDER IN THE TREATMENT OF CANCER OF THE UTERUS.

LUTAUD insufflates the following powder daily, the os being exposed by means of a speculum:

℞ Acid. salicyl., gr. iv;
Acid. boric., ʒi;
Iodoformi, ʒii;
Ess. eucalypt., q. s.

—*Der Frauenarzt*, Heft 3, January 9, 1894.

FORMULA FOR THE ADMINISTRATION OF IODIDE OF POTASSIUM.

FOURNIER suggests the following formula for the administration of iodide of potassium:

℞ Iodide of potassium, ʒvi;
Anisette, ʒii;
Simple syrup, ad ʒvi.
Dessertspoonful three times a day.

—*Der Frauenarzt*, Heft 3, January 9, 1894.

TREATMENT OF ACUTE METRITIS.

The following treatment of acute metritis is given in the *Revue Obstetricale et Gynècologique*, March, 1894: Absolute rest, laudanum fomentations upon the stomach, frequent hot irrigations with emollient and slightly aromatic liquids. The following represents an excellent formula:

℞ Chloral,
Naphthol,
Alcohol, of each, ʒiii;
Water, ʒviii.

A tablespoonful of this mixture is added to a quart of hot water. After each injection there is placed in contact with the os a pledget of absorbent cotton soaked in the following mixture:

℞ Iodoform, ʒi;
Chloral, ʒi;
Glycerin, ʒiii.

In case of very severe pain, blisters applied to the abdominal surface give relief, or in milder cases these may be replaced by compresses sprinkled with turpentine or alcohol and covered with oiled silk. Scarification and leeches applied to the os are absolutely useless during the acute stage.

RADICAL OPERATION FOR LARGE HERNIA IN MALE CHILDREN.

SZUMAN (*Therapeutische Monatshefte*, Heft 3, 1894) holds that as soon as a congenital hernia shows signs of increasing operation should be undertaken, especially when the retention apparatus is not efficient. He operated on a child aged two years, with a scrotal tumor hanging to the knees. He dissected the neck of the hernial sac from the surrounding structures of the cord, freeing this sac to the external ring. A ligature was then placed as deeply as possible and the wound was tamponed with iodoform gauze. Two years later the child came under observation; the cure was found to be perfect.

A second child operated on was fourteen months old. Four and a half years later the cure was found to be permanent.

The third child was three months old when operated on. Eight years later the cure was perfect.

The fourth child had a colossal double scrotal hernia. In these operations free dissection of the neck of the hernia was extremely difficult. The dissection should always be begun high up, since here it is easier. When it cannot be completed in the lower part of the scrotum, as is often the case in congenital hernia, this portion is cut off and drained.

TREATMENT OF VENEREAL LYMPHADENITIS.

NOBLE (*Archiv für Dermatologie und Syphilis*, Bd. xxvii., Heft 1, 1894) reported to the Vienna Dermatological Society the results of his investigations into the method of treating venereal lymphadenitis proposed by Lang.

The treatment pursued is as follows: When a case was presented in which abscess-formation had taken place, this was punctured with the point of a bistoury and the contents evacuated by moderate pressure. The remaining cavity was washed out with a one-per-cent. solution of nitrate of silver driven in with some pressure. This solution was evacuated through the puncture and pressure bandages applied. In very large abscesses two puncture-points were made, more efficient drainage being thus secured.

This treatment of puncture, evacuation, and injection was continued two or three days, until there was no further secretion. This usually required but two injections. At first, after treatment there is a thick chocolate-colored exudate; finally only blood-stained serum escapes on puncture, and this, if it persistently accumulates, may often be left to absorption. When a case was presented in which abscess-formation

was not complete, showing uncertain fluctuation, the injections of nitrate of silver were forced not only into the cavity left by partial evacuation of the pus, but also in the surrounding infiltrated tissue. This causes, in two or three days, a painless softening of the diseased glands, or even brings about a more favorable result,—*i.e.*, prompt resolution of the inflammation. The treatment is contraindicated in the strumous form of buboes. These cases require radical operation. In seventy cases treated according to the method just detailed the average period of healing was ten days. In eight cases healing occurred in from three to five days. In eight cases cure was not accomplished for twenty-five to thirty days. In the great majority convalescence was complete in from five to ten days.

EXTERNAL APPLICATIONS OF SALICYLIC ACID.

MÜLLER (*Therap. Monats.*, March, 1894) claims that salicylic acid, when applied externally, exercises a powerful effect upon the economy, being especially efficacious in acute rheumatism when this is accompanied by skin-symptoms. Salicyl ointment he found particularly efficacious against the violent rheumatoid pains accompanying grip. In the case of idiosyncrasy against salicylic acid, he found the drug was taken perfectly when it was administered in wine of creosote.

PROSTATO-CYSTOTOMY.

BELFIELD (*Journal of the American Medical Association*, April 7, 1894) calls attention to the fact that the operation of Kraske for extirpation of the cancerous rectum has suggested to various surgeons a method of reaching important structures placed at the base of the bladder. Ullman removed a tuberculous seminal vesicle; Dittel proposed and Kuster executed the post-urethral excision of lateral masses of the enlarged prostate; Cabot suggested the extraction of ureteral calculi; and the present writer drained a suppurating prostatic utricle. Belfield then proceeds to call attention to what he terms posterior prostato-cystotomy.

The anæsthetized patient is placed upon the left side, thighs flexed to a right angle, hips elevated eight inches or more, rectum empty, and bladder moderately distended with air; a broad grooved staff is introduced. From a point midway between the tip of the coccyx and the right tuber ischii a superficial incision is carried forward, curving towards the raphe, which it reaches one and a half inches in front of the anus. Guided by a finger in the rectum and the staff, by blunt dissection the rectum is separated from the membranous urethra, prostate, and bladder-wall. The rectum being held out of the way by a retractor (it would be desirable here to ligate on each side the prostatic venous plexus, if unusually large), the point of a knife is made to enter the groove of the staff exactly in the median line half an inch above, and is carried downward to a point the same distance below the upper border of the prostate, dividing the trigone, the so-called "middle lobe" of the prostate, and the prostatic utricle, and terminating just above the orifices of the ejaculatory ducts. If required, the incision can be safely extended in the median line upward half an inch and downward through the thin commissure joining the lateral lobes of the prostate.

When the divided edges are drawn apart, the entire prostatic surface is accessible to eye and finger; the bladder can be drawn downward and the ureteral orifices exposed (on the cadaver). Complete suturing of the wound in bladder and prostate, while practicable, would probably be less desirable than partial suturing and drainage through the upper angle of the wound, which corresponds with the lowest point of the contracted bladder. This incision, he holds, gives perfect command of the entire prostate and base of the bladder and perfect drainage, hence reducing the dangers of infiltration to a minimum. It is also practicable in cases of contracted bladder in which the suprapubic method is not adapted. The author has used this cut for removing a calculus and lateral masses of the enlarged prostate.

Belfield also describes a new method for drainage of the bladder. A tenotome is made to enter the perineum with horizontal blade an inch or more in front of the anal margin, is passed between the prostate and rectum, and thrust into the bladder between the upper extremities of the prostatic lobes. A slender forceps is carried along the blade, the knife is removed, and the channel dilated by separation of the branches of the forceps for introduction of a drainage-tube. This incision opens and drains the prostatic utricle, an important factor in prostato-cystitis from any cause.

CHRONIC RELAPSING APPENDICITIS.

BULL (*Medical Record*, vol. xlv., No. 13) records eighteen operations for relapsing appendicitis with one death. These operations

were done because of acute attacks so frequently repeated as to lead to the belief that there was a chronic appendicitis which had no tendency to disappear spontaneously or with the aid of medical measures. In most cases there was a tumor and a history of chronic invalidism. In about eighteen or twenty cases he advised against operation, because the attacks were at long or irregular intervals, and the interval was apparently one of good health, without tumor and without history of intestinal irregularity or pain.

Two of the operative cases were females. In seven pus was found on the operation, either in the appendix or close by in the false membrane, and the adhesions were firm and thick in the majority. One patient had been drained for an abscess only eighteen months previous to operation. The appendix was not found. Following recovery there were occasional attacks. On operation, the appendix was found, with lumen still patent and sharply curved, buried in a thick layer of false membrane lying on the surface of the cæcum.

Four hundred and fifty operations by various operators are tabulated, with eight deaths. Perhaps five or six per cent. would be nearer the truth.

SURGICAL USES OF SULPHO-NAPHTHOL.

BERRY (*New England Medical Monthly*, No. 145, vol. xiii.) strongly commends sulpho-naphthol in surgical practice. In the treatment of incised and lacerated wounds these lesions and the surrounding parts are thoroughly cleansed with a brush, and a one- or two-per-cent. solution of the drug is applied. Sutures are then employed, and the wound dressed with sterile gauze. For vaginal and uterine douches half to one drachm to the quart of water is the proper strength. Chronic cystitis is benefited by frequent irrigations, half a drachm to two quarts. This drug is not neutralized by albumin, does not injure instruments, does not irritate the hands, and is free from toxic properties. It is not as powerful an antiseptic as bichloride of mercury or carbolic acid.

TREATMENT OF ULCERATION OF THE RECTUM

MATHEWS (*New England Medical Monthly*, No. 145, vol. xiii.) thus treats ulceration of the rectum. Benign ulcers absolutely require rest. This is best secured by a preliminary thorough purging and by confinement to bed combined with local applications. The diet should be liquid. The ulcer, if indolent, should be touched with nitrate of silver, and after a healthy action is established, daily injection should be made into the rectum of,—

℞ Sweet almond oil, ℥i;
Iodoform, gr. v;
Nitrate of bismuth, ʒss.

Malignant ulceration should be excised at once. Tuberculous ulceration should be removed by the curette, if possible; if not, by the knife. Syphilitic ulceration is, when combined with stricture, about as incurable as cancer; hence resection is the only means of treatment.

ELÆOMYENCHYSIS, OR THE TREATMENT OF CHRONIC LOCAL SPASM BY INTRAMUSCULAR INJECTION AND CONGELATION OF OILS.

On the basis of cases treated by the method indicated in the title, CORNING (*New York Medical Journal*, April 14, 1894) writes in support of this treatment.

It is quite possible to inject melted, non-irritating oil into the living tissues, to allow it to congeal there, and to remain indefinitely without provoking the least inflammatory action. The vigor of muscular action may be sensibly diminished by curtailing the blood-supply. It follows from these two propositions that by injecting melted oil into a spastic muscle in sufficient quantity to interfere materially with the blood-flow and metabolism, then solidifying by means of cold, there would result interference with the nutrition and curtailment of the action of the muscle, the hardened oil acting as a species of intramuscular splint.

The case on which this method was tried suffered continuously for four months from clonic spasm confined to the left splenius muscle. The spasms were extremely violent and recurred frequently. Oil of theobroma was mixed with paraffin in such proportion that it remained solid at the temperature of the body. Eight hundred minims of this mixture were injected into the centre of the muscle. The fluid oil was promptly rendered solid by the aid of an ether spray and subsequently by the application of a small ice-bag over the muscle. The oil was so injected that it extended almost the entire length of the muscle. Some hours subsequently, as there was no inflammatory reaction, supplementary injections were made, forming fat segments, extending across the muscle at right angles to its axis. These injections were hardened as before. The clonic spasms ceased immediately, and there

remained only a certain rigidity, which became gradually less. There was no pain; the head could be held in normal position; the patient could sleep on the affected side without discomfort.

These injections should be made while the muscle is flexed, to allow of more even distribution and to secure splinting in this position. If necessary, ether may be administered to accomplish this where we are confronted with severe tonic spasm. The second point of importance is the distribution of the oil, which should be made regularly through the affected muscle; moderate massage greatly facilitates this part of the operation. A needle of large size, provided with an ample lumen, is necessary for the injection, and the syringe should hold at least half an ounce and be heated to 110° F. before filling.

COCAINE-POISONING.

KROGIUS (*Centralblatt f. Chir.*, No. 11, 1894) cites cases collected by Réclus, all due to colossal doses, and holds that, instead of injecting the drug just beneath the skin or in the substance of this, it should be driven deep down as near as possible to nerve-trunks. The injection should be made as the needle is being withdrawn. From 15 to 20 drops of a two-per-cent. solution are employed. After about ten minutes complete anæsthesia over a comparatively large area is produced. Thus, in the case of the fingers, for instance, by driving the injection in at the root, near the position of the supplying nerve-twigs, the entire finger to its deepest part becomes completely anæsthetized.

Reviews.

A TEXT-BOOK ON DISEASES OF THE EYE. By Henry D. Noyes, A.M., M.D. Second and revised edition. Illustrated by five chromo-lithographic plates, ten plates in black and colors, and two hundred and sixty-nine wood-engravings.
New York: William Wood & Co., 1894.

Many good things in this world, like Massachusetts, need no eulogy, and, among text-books devoted to ophthalmology, Dr. Noyes's work easily takes high rank in this respect. We admired and commended the first edition, and are glad to welcome the second and reiterate this commendation.

The whole book has received thorough revision, many portions being practically rewritten. A notable feature is the author's familiarity with the literature of ophthalmology, which has been utilized so well that the reader is quickly in possession of all that is valuable in the text-books, brochures, and papers bearing upon the eye. To quote from the preface, "the writer's judgment on new suggestions has been freely given on points where he has opinions," and it should be remarked that Dr. Noyes usually has opinions to which one may well pin his faith.

The departures from the paths of strict literary rectitude, to borrow a sentence from a well-known reviewer, are more frequent than agreeable, but they are readily forgiven in a book which, in other respects, is so good, so replete with sound teaching, clear judgment, and the fruits of wide experience.

ANOMALIES OF REFRACTION AND OF THE MUSCLES OF THE EYE. By Flavel B. Tiffany, M.D.
Kansas City, Mo.: Hudson Kimberly Publishing Company, 1894.

The object of this book, according to the preface, is to present the subject of the anomalies of refraction and of the muscles of the eye "in as clear, brief, and concise a manner as possible, embracing all essentials, besides collaborating recent advancements not to be found in the existing books." The main portion of this task the author has accomplished fairly well, and many of the methods of examining for anomalies of the functions of the ocular muscles are more fully discussed in this volume than is customary. This is a commendable feature.

The book is profusely illustrated, and some of the cuts, especially those inserted in connection with the descriptions pertaining to reflection and refraction of light, answer an excellent purpose; others are dismal failures, and a goodly number are suitable in instrument-makers' catalogues, but have no particular value in a scientific treatise. The plates depicting the author's results in correcting strabismus are attractive pictures, but their introduction is an exhibition of questionable taste. The diagram of a persisting hyaloid artery is credited to Noyes and not to the author from whom Dr. Noyes borrowed it,—namely, the late Dr. Little.

Dr. Tiffany coins a new plural for apparatus,—"apparati;" perhaps there is authority for this word, but we cannot find it. He inveighs against "blurred print," and has carefully avoided criticism from this stand-point, since the type of his own book is excellent. A novel feature is the introduction of illustrated biographical sketches of Helmholtz, Donders, and Landolt.

LES AGENTS PHYSIQUES ET NATURELS: agents thermiques, électricité, modifications de la pression atmosphérique, climats et eaux minérales; cinquième partie des *Leçons de Thérapeutique*. Par le Dr. Georges Hayem, professeur à la Faculté de médecine de Paris, médecin à l'hôpital Saint-Antoine, membre de l'Académie de médecine.

We have reviewed in the pages of the THERAPEUTIC GAZETTE during the last two years the preceding volumes of this series by Professor Hayem, and have taken occasion each time to speak in a laudatory manner not only of the value of the books themselves, but of the good work which this indefatigable French author is capable of doing. The previous volumes, it will be remembered, dealt, the first with drugs, and the second with the application of drugs to disease. The present volume is devoted to the consideration of remedial measures other than drugs, and takes up exhaustively the use of heat, hydrotherapy, electricity, atmospheric pressure, aerotherapy, climates, and mineral waters, forming with its predecessors a complete monograph upon the therapeutic resources of a modern well-educated physician. We wish that it were possible to have these books translated and published in English, for they combine in a concise form a large amount of information which should be possessed by us all. The price of the volume in the French language is but $2.50.

Correspondence.

LONDON.

(From our Special Correspondent.)

It requires a good deal of experience with any new drug before it can be said to come into popular favor, and the pioneers who experiment with such new substances generally find it somewhat difficult to get others to help them in making the necessary observations. Being personally much interested in pharmacological matters, I try to acquaint myself with most such experiments or their results. Two such drugs have recently attracted some attention from their vaunted use in ophthalmic medicine, and the accompanying notes, which I have been able to put together as the result for the most part of personal observation, may be considered as perhaps worthy of perusal.

First, with regard to "tropa-cocaine," introduced by Chadbourne about two years ago, and used first by Schweigger and others in German clinics. This was said to be a most satisfactory local anæsthetic for even the major ophthalmic operations, possessing the advantage over cocaine that it exercised no cycloplegic effects, and could be used in those cases in which a rise of tension was to be feared. Owing to the difficulty in obtaining the drug, as well as to its great cost, tropa-cocaine did not get a very extended trial in this country, until a little while ago attention was again drawn to it in a paper read before the Ophthalmological Society. The author had used tropa-cocaine in the form either of solution or of ophthalmic tabloids, and gave records of the satisfactory performance of most of the ordinary operations under the anæsthesia induced by its means. After this paper had been read, tropa-cocaine was stocked by one of the leading drug-houses, thus enabling a much more extended trial to be made of its efficacy as an anæsthetic, and I have personally seen it used in a great variety of operations. For the removal of foreign bodies it leaves nothing to be desired, as these can be seen so much more readily against a background of iris, and the patient is not troubled with the inconvenience of a paralyzed accommodation for some hours after. The pain accompanying iridectomy or cataract extraction is also satisfactorily abolished, while absorption into the system is not followed by unpleasant consequences. Besides all this, tropa-cocaine has been very successfully employed as a dilute solution in cases of painful inflammation of the conjunctiva, abolishing the excessive irritability without interfering with the vascular supply. When it becomes better known and cheaper it cannot fail to come into very general use.

In a recent paper by Dr. Casey A. Wood, of Chicago, I notice the curious statement, towards the end of the work, that "tropa-cocaine has, so far as my experiments went, no cycloplegic advantages over cocaine, while its mydriatic action seemed to me to be less than that of cocaine" (Pan-American Congress, 1893). I cannot help thinking that Dr. Wood must have confounded tropa-cocaine with some other drug, or been supplied with the wrong material, for, as I have pointed out above, the pure substance has neither a mydriatic nor a cycloplegic effect. It is only the pure synthetic drug that is suitable for ophthalmic work.

With regard to the second drug—scopolamine—about which I was going to speak, I find that this is already somewhat known in America, and has been mentioned recently in the pages of the GAZETTE. It became first known to me in December, 1890, when a specimen was submitted to me by Messrs. Burroughs and Wellcome. At that time I made a number of physiological experiments with this suggested

substitute for atropine, none of which, however, were published. As it is now highly improbable that they ever will be published in concrete form, I take this opportunity of giving the chief conclusions I was able to draw from my experiments. First, when tested on my own eye, it proved a good mydriatic even when used in very dilute solutions (1 to 1000). When complete mydriasis had been produced it lasted for about a day and a half, after which accommodation became again possible, the pupil becoming normal in the course of the third day. Its action was not at all unpleasant and produced no uncomfortable effect upon the throat. Its general action when tested on animals seemed considerably less than that of corresponding doses of atropine. In order to produce the well-known vagus effect of atropine with scopolamine, greatly larger doses were necessary; in fact, I see from the blood-pressure tracings which I then took, and to which I have just referred, that the inhibitory action of the vagus on the heart was not completely paralyzed by the doses I employed.

Passing now from physiological experiments, which agree, I believe, in results with those made and published recently by other observers, I would describe the clinical use, as observed in this city, of the hydrobromate, which has been placed on the market by Merck. My own experience has been mainly directed to its use in the estimation of refractive errors. For this purpose a 1 to 250 solution has seemed most suitable. The instillations have in each case been made by the surgeon, and absolutely no untoward effects have been observed. Three instillations, at intervals of about half an hour, using each time about two drops from a Liebreich drop-bottle, have in almost every case sufficed to completely paralyze accommodation and to produce full mydriasis, which, if left to itself, has passed off after at most three days. Generally, however, the patient is given a disk of eserine (Wyeth) to insert into the conjunctival sac on the morning following, and this has had a material effect in shortening the period of inconvenience.

The solution of a strength of 1 to 500 has been used also in a variety of conditions in which atropine is usually employed, and those who have used it speak highly of its efficacy in some cases of phlyctenular keratitis and iritis. It has not been known to raise intraocular tension, but perhaps experience has not been sufficiently extensive to warrant the statement that such an effect may not follow its use in some cases. All tell me, and my own experience tallies with that of others, that scopolamine is quite as efficacious as atropine, and that its action is free from the unpleasant by-effects produced by the latter drug.

I hear very varied opinions as to the enjoyability or otherwise of the recent Medical Congress at Rome. The general opinion seems to be, among compatriots most of whom visited the Eternal City for the first time, that the outside attractions were too great to allow one to give a due amount of attention to the more serious sectional work.

THE TREATMENT OF TONSILLITIS.

To the Editors of the THERAPEUTIC GAZETTE:

DEAR SIRS:—I desire to tender my professional brethren a treatment (both *local* and *constitutional*) for follicular tonsillitis, which has proved very satisfactory in my hands for several years.

If seen *very early* and no complications, Dr. Sajous's "*abortive* treatment" with ammoniated tincture of guaiac (a teaspoonful every two hours in sweet milk) will often (not always) be found quite satisfactory. If, however, called to see the patient later, which is generally the case, give calomel, 10 grains; soda bicarb., 20 grains; M. ft. chart. no. iii. One every three hours, floating on a teaspoonful of water, and no liquid after for twenty minutes. These powders to be followed by a teaspoonful or two of castor oil with 10 to 15 drops of turpentine every hour (for first twelve hours), excepting the hour of the powders. Gargle and swallow a teaspoonful of a saturated solution of c. p. sulphate of sodium. After the powders are all used and worked off with the castor oil and turpentine, alternate the solution of sulphite of sodium with the following chloride syrup, both as gargle and systemic remedy:

℞ Pot. chlorat, ℥i;
Ammon. mur., ℥i;
Tinct. ferri mur., ℥iv;
Glycerini, ℥iss;
Syr. limonis, ℥ii. M.
Dose.—Teaspoonful.

If for a child under three years reduce dose of all the remedies and dispense with the gargling, but give no liquids for ten or fifteen minutes after giving the liquid medicine.

This treatment will prove most satisfactory in every case, and comports well with the late theory that it is really "a germ disease" and *infectious*.

C. G. SLAGLE, M.D.,
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